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AQUATIC HABITAT MANAGEMENT PLAN

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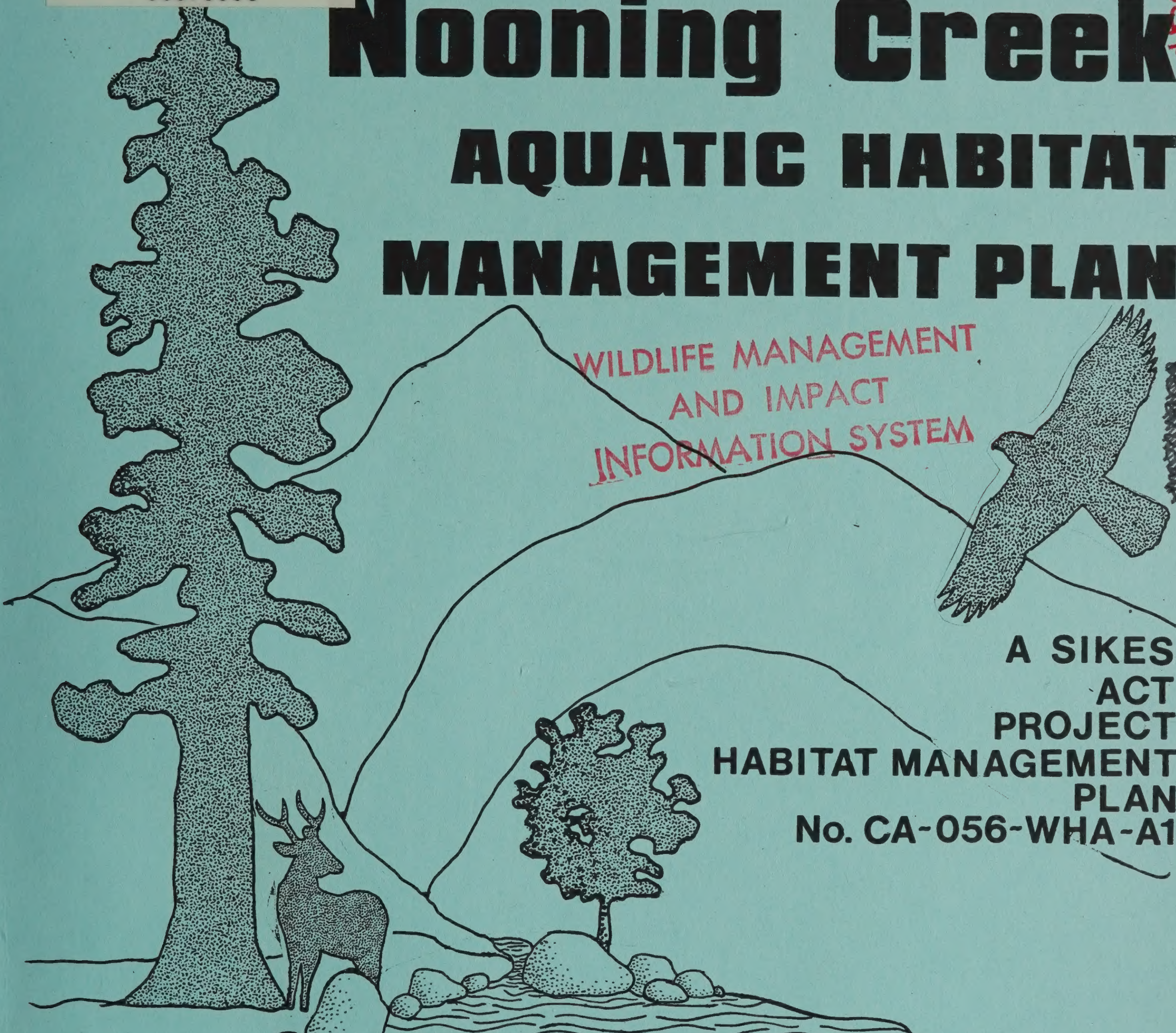

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PLAN
No. CA-056-WHA-A1

.S.Department of the Interior • State of California
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NOONING CREEK WATERSHED

AQUATIC HABITAT MANAGEMENT PLAN

HUMBOLDT COUNTY, CALIFORNIA

NO: CA-056-WHA-A1

A Sikes Act Project

United States Department of the Interior

Bureau of Land Management

Ukiah District

Eureka Resource Area

September 1982

CONCURRENCE AND APPROVAL

The Nooning Creek Watershed Aquatic Habitat Management Plan has been reviewed and approved for implementation by the undersigned parties.

Concurred:	Approved:
California Department of Fish and Game	Bureau of Land Management
Spike Naylor, Regional Manager	Van Manning, District Manager

PREFACE

This management plan reviews the need and legislative basis for restoration of aquatic habitat in the Nooning Creek Watershed of southern Humboldt County, California, and describes specific management procedures for accomplishing its objectives. The Nooning Creek Watershed is entirely within the boundaries of the King Range National Conservation Area, and is a tributary of the Mattole River. Past logging and a major forest fire in the area have resulted in serious erosion, streambed silting, the formation of debris dams, and general degradation of aquatic habitat. Debris has quantitatively reduced habitat use by formation of barriers to spawning adult steelhead trout and salmon, while the quality of spawning and rearing habitat for these anadromous salmonids has been reduced by erosion and silting of the streambed. Planned actions include the following: (A) placement of rock deflectors, (B) reclamation of tributary channels, (C) movement of woody debris, (D) planting along stream corridor, (E) seeding of riparian zone, (F) planting of barren ground; and (G) closing of a road. Coordination of this plan with efforts of other programs and agencies is described. The planned actions are sound practices that will improve salmonid habitat in Nooning Creek. These actions can also provide practical information to assist other watershed rehabilitation and fishery enhancement efforts in the Mattole Basin and elsewhere.

TABLE OF CONTENTS

Page

PREFACE. iii
TABLE OF CONTENTS. v
ACKNOWLEDGEMENTS vii

I. INTRODUCTION 1
  A. The Area 1
  B. Recognition of Need. 1
  C. Purposes of Plan 2
  D. Enabling Legislation 2
  E. Geology. 3
  F. Hydrology. 3
  G. Current Status 4

II. MANAGEMENT OBJECTIVES. 5
  A. Objectives 5
  B. Constraints. 5

III. PLANNED ACTIONS. 5
  A. Placement of Deflectors. 5
  B. Reclamation of Tributary Channels. 7
  C. Movement of Woody Debris 8
  D. Planting Along Stream Corridor 9
  E. Seeding of Riparian Zone 11
  F. Planting of Barren Ground. 12
  G. Closing of Road. 12

IV. COORDINATION WITH OTHER PROGRAMS 13
  A. Forest Management. 13
  B. Recreation Management. 14
  C. Watershed Management and Water Quality 14
  D. Fire Management. 14
  E. Land Management. 14
  F. Animal Damage Control. 14

V. COORDINATION WITH OTHER AGENCIES 15
  A. California Department of Fish and Game 15
  B. California Conservation Corps. 15
  C. Humboldt County. 15

VI. MANAGEMENT EVALUATIONS AND REVISION. 16

VII. IMPLEMENTATION SCHEDULE, PRIORITY AND COST TO BLM. 16
  A. Year 1 (FY-82) 17
  B. Year 2 (FY-83) 17
  C. Year 3 (FY-84) 18
  D. Year 4 (FY-85) 18

REFERENCES CITED 19

TABLE OF CONTENTS

Page

APPENDIXES 23

A. Figures
1. Map of Nooning Creek Watershed 23
2. Locations of Deflector Placement (Action Item A) 25
3. Deflector Design (Action Item A) 26
4. Location of Channel Reclaiming (Action Item B) 27
5. Location of Woody Debris (Action Item C) 28
6. Location of Transplant and Cutting Planting Areas (Action Item D) 29
7. Location of Seeding Areas (Action Item E). 30
8. Location of Road Closure (Action Item G) 31
9. Location of Private Land Along Nooning Creek 32

B. Photos
1. Nooning Creek Woody Debris Dam 33
2. Debris Dam After Selective Log Removal 33
3. Woody Debris Cover For Rearing Juvenile Fish 34
4. Rock Deflector 34
5. Water Channel on Road Surface. 35
6. Reclaimed Channel. 35
7. Redwood Trees in Nooning Creek Watershed 36
8-10. Streambank Erosion Caused by Feral Pigs. 37

C. Public Comment During Preparation of Nooning Creek Plan. . . 39

D. Comments on Draft Nooning Creek Plan 45

E. Preparation and Review Checklist 53

F. Environmental Analysis Record (excerpt). 55
Alternatives/Mitigation 55
Affected Environment. 56
Environmental Consequences. 62

ACKNOWLEDGEMENTS

This management plan was prepared by James A. Decker, Fish and Wildlife Biologist, Eureka Resource Area. In addition, several people deserve special mention for their assistance. John Hamilton helped collect field data and develop planned actions on which this plan is based. Jeff Blakely of Arcata, California, did the cover drawing. Virginia Willis assisted in the design of the cover. Mike Aceituno provided useful ideas and assistance in completion of this plan, and Jack Lahr provided encouragement and many useful ideas from the perspective of a resource manager.

I. INTRODUCTION

A. The Area

The Nooning Creek Watershed is located in southern Humboldt County, California, about 50 miles south of Eureka. This watershed, an area of about 600 acres, is entirely within the King Range National Conservation Area, as shown in Figure 1. Nooning Creek originates on the eastern side of the Queens Peak-Paradise Ridge segment of the King Range. The streambed is about two miles long and rises from 1,000 feet above sea level, where it enters the Mattole River, to about 1,900 feet elevation near its source.

B. Recognition of Need

The need for restoration of the Nooning Creek Watershed and other portions of the Mattole Basin has been consistently documented by studies of the natural resources of the area (USDI Fish and Wildlife Service 1960, California Department of Water Resources 1973, California Department of Fish and Game 1973, USDI Bureau of Land Management 1974). In recent years, especially since 1979, there has been growing concern over the effects of land treatment practices on fish populations in Nooning Creek and other Mattole River tributaries.

Currently, three public agencies and four local public groups are involved in watershed restoration efforts in the Mattole Basin. The agencies involved are California Department of Fish and Game, California Conservation Corps, and U.S. Bureau of Land Management. The local groups are Coastal Headwaters Association, Mattole Center for Science and Education, Mattole Watershed Salmon Support Group, and Mattole Watershed Taxpayers Association. All these groups and agencies recognize the validity of the following statement from the 1973 California Department of Fish and Game report cited above:

> "Without restoration of the watershed, the Mattole River probably will never regain its former glory as a prime salmon and steelhead producing river . . . ."

While all these groups and agencies recognize the need for watershed restoration, their motives are varied. Some agencies are required by law to protect natural resources; other groups or agencies are primarily concerned with conservation and restoration of ecosystems or with the development of socioeconomic or recreational benefits. The economic considerations are substantial. The estimated net annual value of the Mattole Basin anadromous salmonid fishery is more than $2 million (USDI Bureau of Land Management 1980). Regardless of the varied motivations of groups and agencies, there is currently widespread public recognition of the need for watershed restoration in the Mattole Region.

C. Purposes of Plan

Previous reports, such as those cited above, have succeeded in calling attention to the consequences of past land treatment practices in the Mattole Basin and to the need for watershed management programs. These reports have not, however, included specific, detailed plans designed to accomplish watershed management objectives. The governmental agencies and public groups concerned with watershed restoration have recognized the value of the general objectives; now they need detailed management plans. The Nooning Creek Watershed Aquatic Habitat Management Plan is intended to provide specific recommendations and procedures for use in restoration of that watershed.

Nooning Creek was chosen as the subject for the first aquatic habitat management plan to be written for a stream within the King Range National Conservation Area for the following reasons: (1) the watershed is manageable--it is small and accessible, but the flow is well-developed; (2) there are many opportunities for restoration work--the watershed was logged in the 1960s, burned in 1973, and salvage-logged in 1976; (3) baseline data are available--information of comparable quality on stream parameters, such as water temperatures and fish populations, has not been collected for other streams in the area.

The actions detailed in this plan are sound procedures for habitat improvement and enhancement of steelhead trout and salmon populations in the Nooning Creek Watershed. The rehabilitation of this watershed will be expensive, but its value will extend beyond Nooning Creek. It will be possible to evaluate the effectiveness of watershed restoration procedures and to apply the knowledge gained to other watersheds. Information and experience obtained in the Nooning Creek Watershed can provide the basis for a watershed enhancement model to be used for the 80 additional miles of salmonid habitat within the King Range National Conservation Area. The Nooning Creek plan will also supply practical answers to questions regarding steelhead trout and salmon enhancement for the entire Mattole Basin and similar watersheds.

D. Enabling Legislation

The King Range National Conservation Area was established under Public Law 91-476 (The King Range Act), which was signed by President Nixon, October 21, 1970. The following quotation includes a major feature of the act:

> ". . . there will be a comprehensive, balanced, and coordinated plan of land use, development, and management of the area, . . . based on an inventory and evaluation of available resources and requirements for such resources . . . and other features of the Area." (The plan is to cover all lands within the Area, regardless of ownership.)

(emphasis added)

As a result of the above mandate, watershed management/enhancement objectives were designed by the Bureau of Land Management, California Department of Fish and Game, and many members of the public who were involved in developing the King Range National Conservation Area Management Program (USDI Bureau of Land Management 1974). These objectives form the basis for the Nooning Creek Watershed Aquatic Habitat Management Plan and are listed below:

1. ". . . stabilization of soil resources, maintenance or restoration of soil productivity, protection and enhancement of water yield and quality, and reduction of flood and sediment damage, both on-site and off-site."

2. "Improve the quality of aquatic habitat through better regulation of land management practices as well as by rehabilitation of damaged areas."

3. "Increase the quantity of habitat for anadromous fish by removing barriers to their migrations."

(emphasis added)

This aquatic habitat management plan has been developed under the authority of the Sike's Act of 1960 (74 Stat. 1052, as amended in 1974, 88 Stat. 1369 and 1978, and 92 Stat. 921) and a Master Memorandum of Understanding between the Bureau of Land Management and the California Department of Fish and Game (Supplement No. 3, February 1969). The subject agreement is a cooperative plan for the management of Nooning Creek, Humboldt County.

E. Geology

The King Range-Mattole Basin vicinity is characterized by a series of northwest-southeast trending ridges and valleys influenced by the structural trend of the area. The major rock type in the area is hard sandstone (called graywacke) with interbedded shale. The graywacke is generally fairly stable on slopes, but the addition of interbedded shale substantially decreases stability. Most of the soils of the area have been mapped as Hugo, but there are also some Los Gatos soil areas on the south-facing slopes in the northwest corner of the watershed.

F. Hydrology

Nooning Creek flows continuously but has is great variation in flowrate. The extreme variation results from heavy precipitation during high-intensity winter storms (the mean annual rainfall is 90 inches) and virtually no precipitation during the summer months. There is rapid runoff due to poorly engineered roads and skid trails that have densely scored the terrain and impeded infiltration and channel surface runoff. The average flow of Nooning Creek is 1.33-2.00 cubic feet per second (c.f.s.) during the summer months, while flows of 40 c.f.s. occasionally occur during the winter.

G. Current Status

The following description of Nooning Creek is based on the most recent field study of the area conducted during the period from June through September 1981. The entire reach of Nooning Creek was divided into 100-foot sections during the 1981 field study, and camera points were established at 80 sections. The color photographs taken at these camera points in 1981 are on file at the Bureau of Land Management's Eureka Resource Area Office, Arcata, California.

The first reach is from the mouth of Nooning Creek to 800 feet upstream. This reach is within the boundaries of private land, which, for the most part, has not been scored by roads or skid trails. Streambank stability is good, but there is some bank breaking during higher flows. Riparian cover is over 80% and riparian stream shading is over 50%. Woody vegetation is common in the riparian zone. Over 25% of the reach channel is pool with depth over 20% of average stream width. Cover is abundant in pool areas. Spawning area is rubble to gravel 1-7 inches, with 30% silt. Fish nursery and rearing areas are abundant and are present all year.

The second reach is from 800 feet upstream to 7,900 feet upstream. This reach is within the boundaries of public land. The entire streambank and riparian zone, except for areas with large rock outcrops, have been scored by road, skid trail, and log landing construction. At 2,900 feet there is a canyon with many large boulders in the stream channel. These boulders trapped 200 cubic yards of woody debris (Appendix, Photo 1) sometime before 1972. This debris dam was a complete barrier to migrating adult fish. Selective log removal work on this barrier was completed in August 1980 (Appendix, Photo 2). Streambank condition is poor, with erosion common at low flow and severe at high flow. There is little vegetative protection. Riparian cover is less than 50%, and riparian stream shading is less than 5%. Woody vegetation in the riparian zone is rare or absent. Only about 10% of the channel is pool, and there is little or no cover over these areas. Spawning area is rubble to gravel 1-7 inches with 40%-50% silt. Nursery and rearing areas are present but are very limited.

The last reach covers a distance of about 0.5 mile from 7,900 feet upstream to the source. There are major areas of erosion occurring in this reach due to past tractor logging. These areas have dumped extensive amounts of sediment into the stream channel. Sediment and other debris have formed many dams, which have trapped alluvial material and destroyed the aquatic habitat in this reach.

Forty-three 100-foot sections of the first and second reaches were rated for percentage of optimal trout habitat during August 1981 (Priority A limiting factors, USDI Bureau of Land Management 1978a). These ratings were generally very low, with no sections receiving ratings of more than 70% optimum habitat, and all but ten sections being rated as less than 50% optimum habitat.

All the property along Nooning Creek is public property managed by the Bureau of Land Management except for the privately owned property in the first reach. The history of the area is detailed in a book by Raphael (1974).

II. MANAGEMENT OBJECTIVES

A. Objectives

The general management objective is to restore and maintain the capability of the Nooning Creek Watershed to produce anadromous salmonids and to provide riparian habitat for some 200 species of wildlife.

Specific objectives are:

1. To increase the degree of stream shading from less than 5% to 70% or more.
2. To increase the degree of riparian cover from less than 50% to 90% or more.
3. To increase the degree of stream channel stability from less than 50% to 70% or more.
4. To increase low stream flow 5%.
5. To reduce seasonally high water temperatures to 70°F or less.
6. To increase salmonid rearing habitat 200% in 33 100-foot sections.
7. To reestablish a coho salmon population.
8. To increase ground cover from 0% to 70% or more on 100 acres of critical slopes, old skid roads, fill slopes, etc., within the Nooning Creek Watershed.
9. Adopt zero percent as the total allowable projected decline in anadromous fisheries habitat in the Nooning Creek Watershed.

B. Constraints

There are no management framework plan constraints or restrictions on this habitat management plan related to protection of endangered plants, primitive values, archaeological values, or other known values. Environmental analysis of the planned actions in this text is on file at the Bureau of Land Management's Eureka Resource Area Office, Arcata, California.

III. PLANNED ACTIONS

A. Placement of Deflectors

Rock deflectors will be used to improve salmonid rearing habitat.

Rationale

The Nooning Creek channel can be characterized as wide and uniformly shallow with variable velocity. Many sections have no distinct thalweg[1], and in some cases the channel is braided into two or more divisions. Preliminary measurements show average water depth in sections of Nooning Creek to be between 2 1/2 to 5 inches - marginal habitat for yearling steelhead. Restoration efforts that would have the greatest benefit to Nooning Creek steelhead parr are those that would result in a reduction of channel width as well as an increase in depth and velocity. Such efforts will be accomplished through the placement of deflectors, which will use hydraulic forces of the stream to deepen and narrow the channel. These would be constructed primarily of interlocking boulders of a sufficient size to withstand a moderate storm event interval ($\geq$ 16 inches in diameter). Boulders are available near the site and will require a minimum of transportation. Wherever possible, materials will be removed from the creek if such activity will deepen the channel. Boulders will be moved by workers with pry bars and when necessary a grip hoist will be used. Relatively low peak velocities associated with storm events in Nooning Creek's small watershed will make boulder size manageable by labor intensive efforts alone, and use of heavy equipment will be unnecessary. Placement of rocks to form groins and rip rap in this manner has resulted in reports of as much as sevenfold increases in steelhead numbers (Haugen 1978). A conservative expectation for Nooning Creek is an increase of 200% in the steelhead population.

Methods

Figure 2 (Appendix) shows the location of 33 100-foot sections where deflectors are to be placed.

1. Materials for deflectors will be secured from the general site area whenever possible.

2. Deflectors will be formed by interlocking boulders of a size sufficient ($\geq$ 16 inches in diameter) to withstand a moderate storm event. Larger boulders, up to 40 inches in diameter, will be used when possible to improve durability of structures.

3. Angular rock will be used whenever possible.

4. Deflectors will be triangular (not peninsular).

5. Deflectors will be placed approximately every four (4) channel widths (= 15 ft.) and will extend at a 20° to 45° angle downstream from the bank.

6. Rocks and such revetment will be positioned to provide angular hiding areas.

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[1] The path of maximum depth in a river or stream. This path normally follows a meandering pattern, back and forth across the channel.

7. Opposite bank downstream area impacted by deflected current will be armored with boulder revetment.

8. Logs and other woody debris, when available, will be placed on the top of boulder deflectors (Appendix, Photo 3).

9. Refer to Appendix, Figure 3 and Photo 4, for examples of deflector design and installation.

Cost/Work Month (WM) Estimate

BLM	0.37 WM	$1,036.00
California Conservation Corps 201 crew (8 person crew)	0.37 WM	$4,970.00
	Total	$6,006.00

Implementation Schedule

November FY-82	10 sections
November FY-83	23 sections

B. Reclamation of Tributary Channels

Portions of six tributary channels will be restored by excavating the sections of an abandoned logging road that cross these tributaries.

Rationale

When a logging road was constructed along 4,300 feet of Nooning Creek, the watershed protection role and the flow pattern of six (6) tributary channels were disrupted. During construction of the road, fill material was dumped into the tributary channels and, after leveling, the road surface was lower than the tributary channels. This road and its associated spur roads now act as drainage ditches. During high flows, they transport water rapidly down their unprotected surfaces (unlike natural channels that have trees, rocks, and woody debris that reduce water velocity). Sediment is transported downslope at varying rates, depending on water velocities and the size of the sediment particles (Leopold, Wolman, and Miller 1964; Morisawa 1968). Erosion gullies have formed along these roads, and there are large deposits of sediment where road runoff enters Nooning Creek. During the low flow period, these gullies, the road surfaces, and the adjacent log landings receive water that should be flowing in the tributary channels (Appendix, Photo 5). This water is only partially absorbed by the compacted surface of the road and log landings, and most of the water (approximately 52 gallons per minute) is lost to the stream system due to evaporation. Moreover, water that enters the stream system after flowing over the exposed road surface or around fill material is about 20°F warmer than water in the natural channel. It has been suggested by USDI Bureau of Land Management (1964) that fill material and culverts be removed from stream channels after logging operations in the King Range area to reduce the impacts mentioned above; soil loss (erosion), however, was considered most important. BLM's 1964 report also suggested constructing large water breaks (bars) and seeding for improvement of wildlife habitat and prevention of soil movement. Reclamation of natural tributary channels would reduce injection of sediment into Nooning Creek, would lower water temperature in the main channel of Nooning Creek, and would add about 5% to the low flow rate of the creek.

Methods

Figure 4 (Appendix) shows the location of channel reclaiming.

1. Remove fill material using a bulldozer and a backhoe.
2. Shape channel to its natural slope using a backhoe.
3. Backfill erosion gullies and road with the fill material and then shape to the natural slope of the surrounding terrain.
4. Rip road surface to a depth of 6 inches (USDA Soil Conservation Service 1980).
5. Construct waterbars every 50 feet on road surface.
6. Surface apply a 1-1-1 ratio starter fertilizer, such as 20-20-20, at 300 pounds per acre or equivalent amount (Wood, Winkelaar, and Lindsay 1974).
7. Seed - refer to action item E (page 11).
8. Apply straw mulch at a rate of 1 1/2 tons per acre (Wood, Winkelaar, and Lindsay 1974).
9. Refer to Appendix, Photo 6 for example of completed channel reclaiming project.

Cost/Work Month (WM) Estimate

BLM	0.25 WM	$ 700.00
Contract		$6,000.00
	Total	$6,700.00

Implementation Schedule

September FY-82	Complete Action Item

C. Movement of Woody Debris

Selected woody debris will be moved from its present instream location and placed so as to armor currently unprotected streambank areas.

Rationale

The channel of Nooning Creek contains a large amount of woody debris. Most of this woody debris does not obstruct the flow or pose a barrier to migrating fish and is beneficial to both rearing and spawning salmonids (Swanson and Lienkaemper 1978; Swanson, Fredriksen, and McCorrison 1979).

However, several piles of woody debris influence streamflow in adverse ways. In some cases, debris diverts and accelerates water toward unprotected streambank areas causing erosion and increased streambed sedimentation. Restoration efforts with the greatest benefit to the Nooning Creek fish and fisheries are those that would result in a reduction of sedimentation. Moving selected woody debris would reduce the amount of streambank erosion currently occurring during high flow conditions in Nooning Creek.

Methods

Figure 5 (Appendix) shows the location of woody debris that will be repositioned.

1. Transporting and positioning of woody debris will be done using a hand grip hoist.

2. The upstream ends of logs and stumps will be securely cabled to the downstream face of a large boulder or cabled to a large stump upslope of the streambank or will be anchored into the streambank using large rocks as ballast.

Cost/Work Month (WM) Estimate

BLM	0.25 WM		$ 700.00
California Conservation Corps 201 crew (8 person crew)	0.25 WM		$3,360.00
		Total	$4,060.00

Implementation Schedule

August FY-82	Complete action

D. Planting Along Stream Corridor

Vegetation will be planted along the stream corridor to increase stream shading from less than 5% shaded to more than 70% shaded.

Rationale

Removal of streamside forest cover by logging and fire has affected the water temperature of Nooning Creek in a variety of ways including: (1) reduced cover has resulted in increased direct exposure to sun and (2) increased silt has reduced depth of channels, allowing water to be heated more quickly by exposure to sun (Hynes 1970). However, the Nooning Creek stream temperature regime is based principally on the extent and intensity of solar radiation. An example, using 1981 Nooning Creek data, follows:

Date (time)	Weather Observation		Stream Temperature
June 30, 1981 (1600)	Scattered: Visibility:	0.1 sky cover 20 miles	78°F

Date (time)	Weather Observation		Stream Temperature
July 1, 1981 (1545)	Fog: Visibility:	0.8 sky hidden 1 mile	70°F

Water temperature can profoundly affect fish populations by reducing activity, interacting with other environmental factors, or even killing fish. Upper lethal temperatures for free-swimming steelhead/rainbow trout range from 71.6°F to 84.2°F (Gardner 1926, Green 1950, Black 1953, Brett 1956, Bishai 1960, Huet 1962, Frost and Brown 1967, and Charlon, Barbier, and Bonnel 1970). To restore the natural temperature regime in Nooning Creek, vegetation should be planted along the stream corridor. A comparable stream within the King Range, but without Nooning Creek's excessive logging damage, had a maximum temperature of 69°F and a maximum diurnal fluctuation of 10°F in 1981. Adequate shade for this comparable stream was provided by leaving many noncommercial trees and shrubs, which provide a natural seed source. The Nooning Creek Watershed contains very few trees in the riparian zone old enough to produce seed.

Methods

Figure 6 (Appendix) shows the location of transplant and cutting plantings.

1. Only native or naturalized[1] species will be planted (e.g., alder, willow, Douglas-fir, and live oak).
2. Plant mixtures, especially on variable sites, will be used.
3. Transplants and cuttings will be planted using a hand-operated power auger.
4. Plantings shall be placed into augered holes at least three (3) feet deep (USDA Soil Conservation Service 1980).
5. All cuttings shall have at least one (1) foot or at least two (2) nodes above the ground level (USDA Soil Conservation Service 1980).

Cost/Work Month (WM) Estimate

Materials	$4,500.00	$4,500.00
BLM	1 WM	$2,800.00
California Conservation Corps 201 crew (8 person crew)	1 WM	$13,440.00
	Total	$20,740.00

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[1] Refers to a non-native species of plant which is well established in the area as a part of the ecosystem and which sustains its population without requiring human assistance (such as stocking or reseeding).

Implementation Schedule

December FY-82	6,000 transplants/cuttings
December FY-83	12,000 transplants/cuttings

E. Seeding of Riparian Zone

Vegetation will be reestablished by seeding to increase riparian cover from less than 50% to 90% or more.

Rationale

Most of Nooning Creek's riparian zone has been tractor logged within the last two decades. Poorly engineered roads and skid trails have densely scored this area and stimulated mass soil movements, which in turn delivered exceptional amounts of sediment into Nooning Creek. These mass soil movements have begun to diminish, but since less than 50% of the riparian zone is covered with vegetation, exceptionally high amounts of sediment are still entering the stream. Increasing the percentage of vegetative cover in Nooning Creek's riparian zone would retard overland sediment flows and reduce weathering effects on the soil, which would reduce the amount of sediment entering Nooning Creek. Extensive literature exists on the importance of riparian vegetation buffer strips (Trimble and Sartz 1957, Evans 1960, Burns 1970 and 1972, and Krammes and Burns 1973).

Nooning Creek's high sediment load has an adverse impact on the survival of the steelhead/rainbow trout ova, fry, juveniles, and adult fish and the growth, distribution, and abundance of the fish population.

Methods

Locations of areas to be seeded are shown in Figure 7 (Appendix).

1. Only seed from native or naturalized species will be used. However, choice of species will depend on availability of seed.

2. Seed mixtures, especially on variable sites, will be used.

3. A hand operated whirlwind seeder will be used.

4. Small seed, such as alder seed, will be mixed with large seed or sand to ensure better seed distribution.

5. Seed will be applied by a two-pass method. The second pass with the seeder is to be accomplished by walking at right angles to the first pass to ensure even coverage.

Cost/Work Month (WM) Estimate

Materials			$2,500.00
BLM	0.5 WM		$1,400.00
California Conservation Corps 201 crew (8 person crew)	0.5 WM		$6,600.00
		Total	$10,500.00

Implementation Schedule

FY-82	28 acres
FY-83	17 acres

F. Planting of Barren Ground

One-hundred acres of barren ground within the Nooning Creek Watershed will be revegetated.

Rationale

The Nooning Creek Watershed contains about 100 acres of barren ground (e.g., logging road cut and fill slopes). Vegetation should be planted on these areas because it plays several important roles in watershed protection. It binds and covers shallow soils by a system of interwoven tree and shrub and grass root systems. A forest canopy would reduce the impact of precipitation falling on these exposed soil areas by intercepting rain through a maze of leaves, branches, and stems. An increase of ground cover would reduce the downhill velocity of accumulated water and thus reduce surface erosion. It has been shown in one watershed that revegetation of logging road cut and fill slopes reduced sediment in adjacent streams by 50% (British Columbia Ministry of Environment 1980).

Methods

Specific actions to increase ground cover are included in the text of this plan (see Action Items 4 and 5). The most successful methods from Action Items D and E, pages 9 and 11, will be used during implementation of this action item.

Cost/Work Month (WM) Estimate

Materials			$5,000.00
BLM	1 WM		$2,800.00
California Conservation Corps	1 WM		$13,240.00
(8 person crew)		Total	$21,240.00

Implementation Schedule

FY-84	50 acres
FY-85	50 acres

G. Closing of Road

One-half mile of abandoned logging road will be permanently closed.

Rationale

An abandoned logging road and its associated spur roads have impacted Nooning Creek (see Action Item B, page 7). This road should be closed to motorcycle use to protect 700 feet of streambank and watershed restoration action efforts.

Methods

The location of this proposed action is shown in Figure 8 (Appendix).

1. Logs and other woody debris will be piled and then covered with fill material (soil and rock) to form a barrier.
2. A "Closed to Vehicles" sign will be posted.

Costs

Costs associated with this action are included in Action Item B.

Implementation Schedule

September FY-82, after Action Item B is completed.

IV. COORDINATION WITH OTHER PROGRAMS

The following resource activities would coordinate with this action to the extent that future actions will not adversely affect the accomplishment of the objectives or guidelines mentioned above.

A. Forest Management

Several of the objectives in this plan (erosion control, stream shading, etc.) will involve coordination with the forestry program. Forest rehabilitation is the number one priority objective in the Forest Management section of the King Range Activity Plan (USDI Bureau of Land Management 1974). The major thrust of forestry planned actions for the watershed is conversion from brush hardwoods to fir and pine. However, in order to coordinate with stated wildlife objectives, the methods of forestry management outlined in the Activity Plan will be modified as follows:

1. There will be no brush/hardwood conversion within the watershed until 90% of the watershed's barren areas has 80 to 90% ground cover.

b) Redwood will be substituted for pine as a planting stock.

Experimental redwood planting (1976) within the watershed has been successful (Appendix, Photo 7). In contrast to Douglas-fir and redwood forest, pine forests characteristically have a sparse undergrowth. The intense shade from pine forests can prevent the growth of stabilizing grasses and other vegetation along streambanks, which are then easily eroded and can result in a wide, shallow, and silted streambed (White and Brynildson 1967, Mills 1969).

B. Recreation Management

Increased recreation/visitor patrol is required to monitor the proposed vehicle closure. An average of eight (8) hours a month will be required to inspect the vehicle closure and create a BLM presence in the watershed. A BLM presence in the area will help stop illegal taking of adult salmonids.

C. Watershed Management and Water Quality

The relationships between riparian and aquatic wildlife habitat and quality watershed management is the major thrust of this plan. Upon completion, this plan will become part of the overall King Range Watershed Management Plan and will be incorporated into the development of best management practices (See USDI, Bureau of Land Management, 1979).

D. Fire Management

Wildfires will be controlled, as necessary, to prevent unacceptable biological damage, loss of life, spread of wildfire, etc. Prescribed burning is not to be used within the Nooning Creek Watershed. A wildfire contingency plan will be developed for the Nooning Creek Watershed to protect valuable biological resources.

E. Land Management

The mouth and first 700 feet of Nooning Creek are within the boundaries of private land (Appendix, Figure 9). Therefore, lands management assistance will be required for the proper handling of possible application for a conservation easement. The reason we say possible application is that the present landowner, Mr. Ernest McKee, has been very supportive of stream enhancement work on his property by the California Conservation Corps; however, if Mr. McKee should sell this property to someone who does not support stream enhancement, we would need a conservation easement. The easement should include the area within 200 feet of the high water channel edge on both sides of the creek. The King Range acquisition plan includes these 42 acres. Authority for the acquisition through exchange is provided by the King Range Act (Public Law 91-476) and the Federal Land Policy and Management Act (Public Law 95-579). Every effort should be made to acquire this land if and when it becomes available.

F. Animal Damage Control

Direct loss of streamside vegetation and stabilized streambank areas due to feral pigs will be halted by eliminating the cause, subject to regulation by the California Department of Fish and Game. Major fisheries habitat deterioration by feral pigs is occurring within several watersheds near Nooning Creek. (Refer to Appendix, Photos 8 through 10 for examples of the habitat deterioration.)

V. COORDINATION WITH OTHER AGENCIES

A. California Department of Fish and Game

Management Objective No. 7 (reestablish a coho salmon population) will need to be accomplished by the California Department of Fish and Game (CDFG). The CDFG and BLM are currently working with several local Mattole groups to restore anadromous salmonid populations in the Mattole River and its tributaries. One group, the Mattole Watershed Salmon Support Group, is collecting adult salmon and placing fertilized eggs in streamside incubation boxes with the assistance of CDFG personnel. Nooning Creek does not have any "good" locations for streamside incubation boxes. However, fertilized coho salmon eggs could be taken to the Mad River Hatchery to be incubated. The fry would then be transplanted to Nooning Creek and distributed throughout the stream to ensure that they fully utilize the area available for rearing. Approximately 10,000 young-of-the-year coho should be transplanted into Nooning Creek. Assistance from CDFG personnel will be required to estimate Nooning Creek's salmonid population on an annual basis.

B. California Conservation Corps

Costs to BLM for King Range stream enhancement projects completed in 1980 by the California Conservation Corps (CCC) were 90% less than the approximate contract cost (USDI Bureau of Land Management 1980). Besides envisaging a less expensive use of CCC in accomplishing planned actions for Nooning Creek, the hand labor methods of the CCC are invaluable for practical implementation of most of the actions in this plan.

The CCC is currently raising transplants (i.e., alder, bay, and live oak) for BLM. The transplants will be planted within the Nooning Creek Watershed (refer to Action Item D (page 9).

Estimates of CCC personnel (crew) time needed to achieve action items are included in action item work month estimates.

C. Humboldt County

The BLM will be cooperating with the Humboldt County Public Works Department to develop direct actions to improve the drainage features of the Shelter Cove Road within the Nooning Creek Watershed (see Figure 1). The present drainage systems have led to severe gullying of the downhill slopes and soil slips, which have closed the Nooning Creek Access Road, and to increased sediment levels in Nooning Creek and the Mattole River. When the direct actions are developed they will be incorporated into this plan.

VI. MANAGEMENT EVALUATIONS AND REVISION

This aquatic habitat management plan will be reviewed annually to determine if revision is needed. Once a year, the BLM area biologist and CDFG biologists will review progress on implementation of this plan and submit a report to the BLM area manager. The report will indicate the following:

1. Progress made on implementing the plan.
2. Recommended modifications to the plan.
3. Priorities for future implementation.

With the concurrence of the BLM area manager, the recommended modifications will be forwarded to the CDFG and any other agencies that are parties to a cooperative agreement for their information and approval.

The analysis required to measure progress in accomplishing objectives as stated in this plan are as follows:

1. Fish population estimates in August or September using the method of Moran and Zippin as given by Everhardt et al. (1975).
2. Rate the individual 100-foot sections of Nooning Creek using the method of Duff and Cooper (1978).
3. Infrared aerial photographs of the watershed, and interpretation of the photos as per Cuplin (1978).
4. Monitor summer stream temperature.

Necessary District (BLM)/Regional (CDFG) coordination regarding this plan will be accomplished at the annual BLM/CDFG coordination meeting.

VII. IMPLEMENTATION SCHEDULE, PRIORITY, AND COST TO BLM

When implemented, the following action items will be summarized on BLM Form 6780, Habitat Management Plan Progress Report. They are dependent on adequate funding and work month (WM) allocations and are listed below in order of priority for funding in each fiscal year (FY).

A. **Year 1 (FY-82)**

Action/Analysis	BLM WM	Materials	Contract	Cost
1. Placement of Deflectors	0.12			$336
2. Reclaim Tributary Channels	0.25		$6,000	$6,700
3. Move Woody Debris	0.25			$700
4. Planting along Stream Corridor	0.50	$2,000		$3,400
5. Seed Riparian Zone	0.25	$1,300		$2,000
a. Population Estimates	0.25			$700
b. Rate Sections	0.25			$700
c. Aerial Photographs	0.25		$250	$950
d. Monitor Temperature	0.25			$700
FY-82 TOTALS	2.50	$3,300	$6,250	$16,186

B. **Year 2 (FY-83)**

Action/Analysis	BLM WM	Materials	Contract	Cost
1. Placement of Deflectors	0.25			$700
2. Planting Along Stream Corridor	0.50	$2,500		$7,300
3. Seed Riparian Zone	0.25	$1,200		$1,900
a. Population Estimates	0.25			$700
b. Rate Sections	0.25			$700
c. Aerial Photographs	0.25		$250	$950
d. Monitor Temperature	0.25			$700
FY-83 TOTALS	2.00	$3,700	$250	$12,950

C. Year 3 (FY-84)

Action/Analysis	BLM WM	Materials	Contract	Cost
1. Plant Barren Ground	0.50	$2,500		$3,900
a. Population Estimates	0.25			$700
b. Rate Sections	0.25			$700
c. Aerial Photographs	0.25		$250	$950
d. Monitor Temperature	0.25			$700
FY-84 TOTALS	1.50	$2,500	$250	$6,950

D. Year 4 (FY-85)

Action/Analysis	BLM WM	Materials	Contract	Cost
1. Plant Barren Ground	0.50	$2,500		$3,900
a. Population Estimates	0.25			$700
b. Rate Sections	0.25			$700
c. Aerial Photographs	0.25		$250	$950
d. Monitor Temperature	0.25			$700
FY-85 TOTALS	1.50	$2,500	$250	$6,950

TOTAL COST TO BLM = $43,036.00

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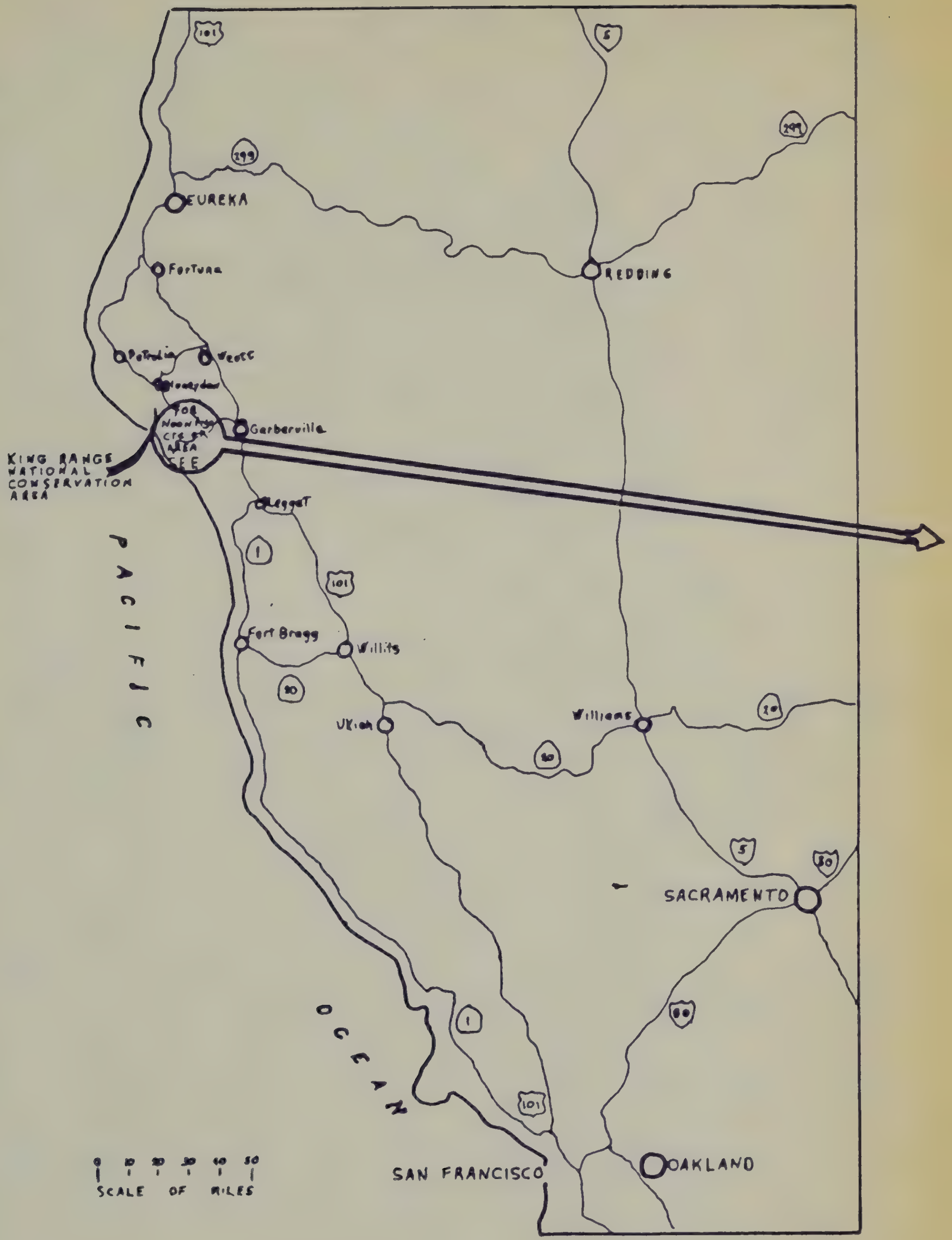
APPENDIX A

Figures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Leggat
1
101
PACIFIC
Fort Bragg
Willits
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Williams
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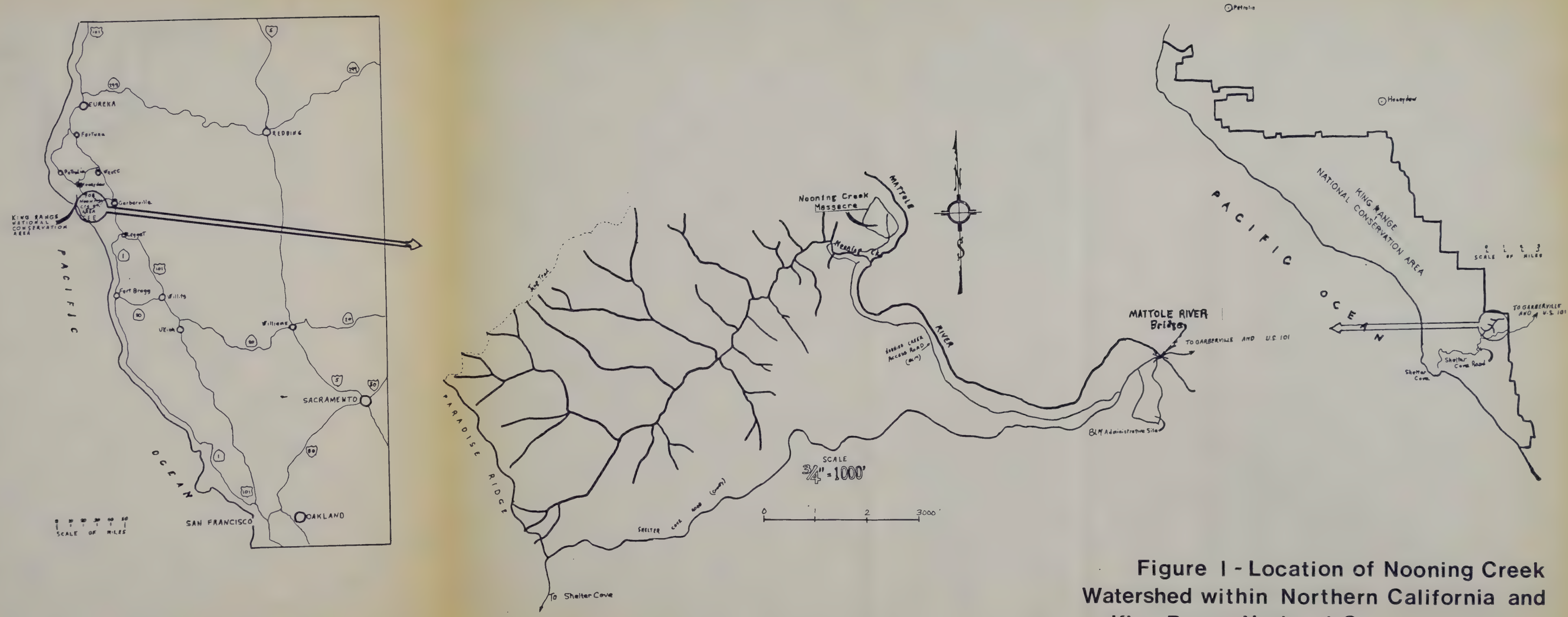
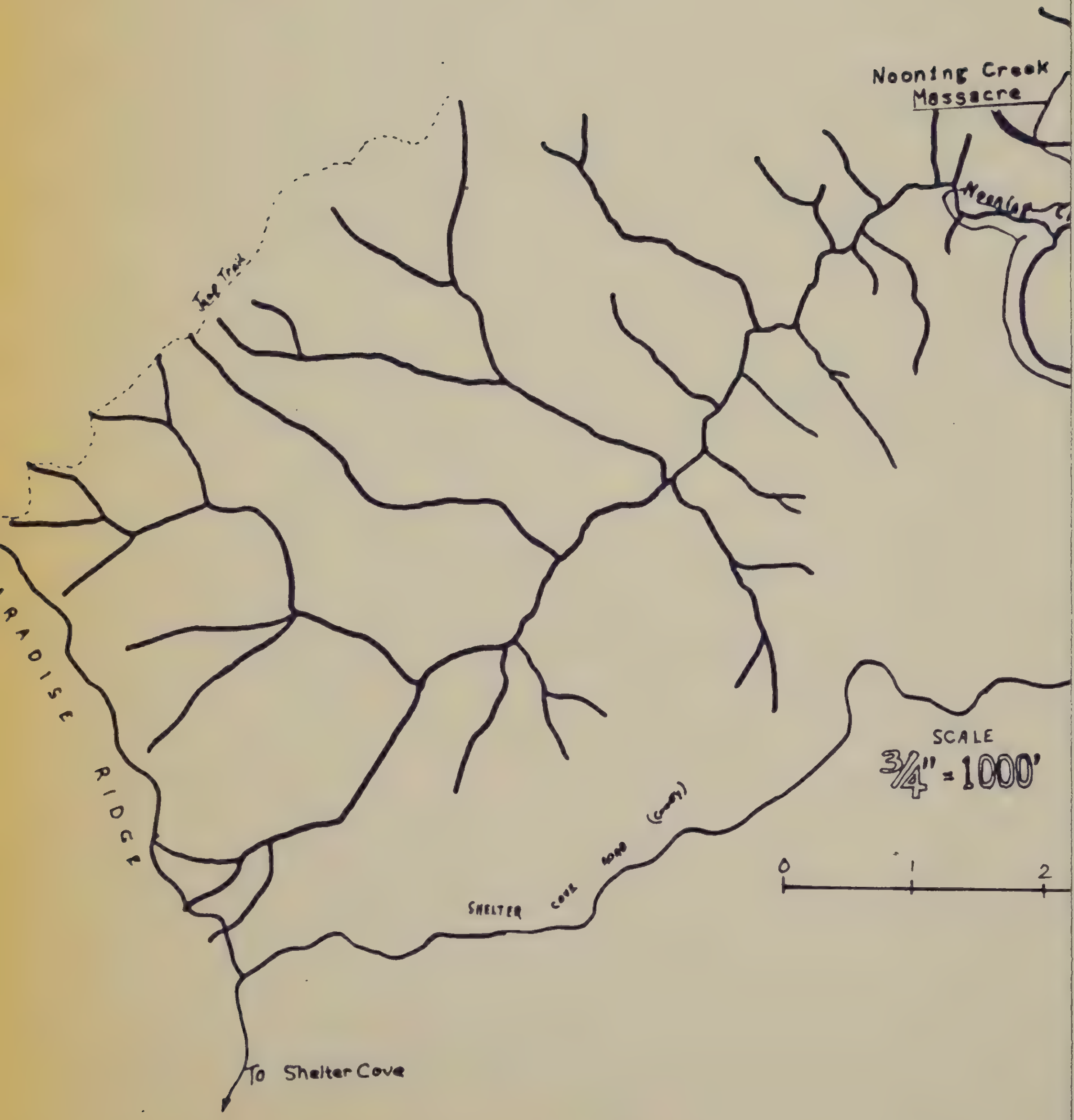


Figure 1 - Location of Nooning Creek Watershed within Northern California and King Range National Conservation Area


Nooning Creek
Massacre
Nooning Cr
Jeep Trail
RADISE
RIDGE
SHELTER COVE ROAD (county)
To Shelter Cove
SCALE
3/4" = 1000'
0
1
2

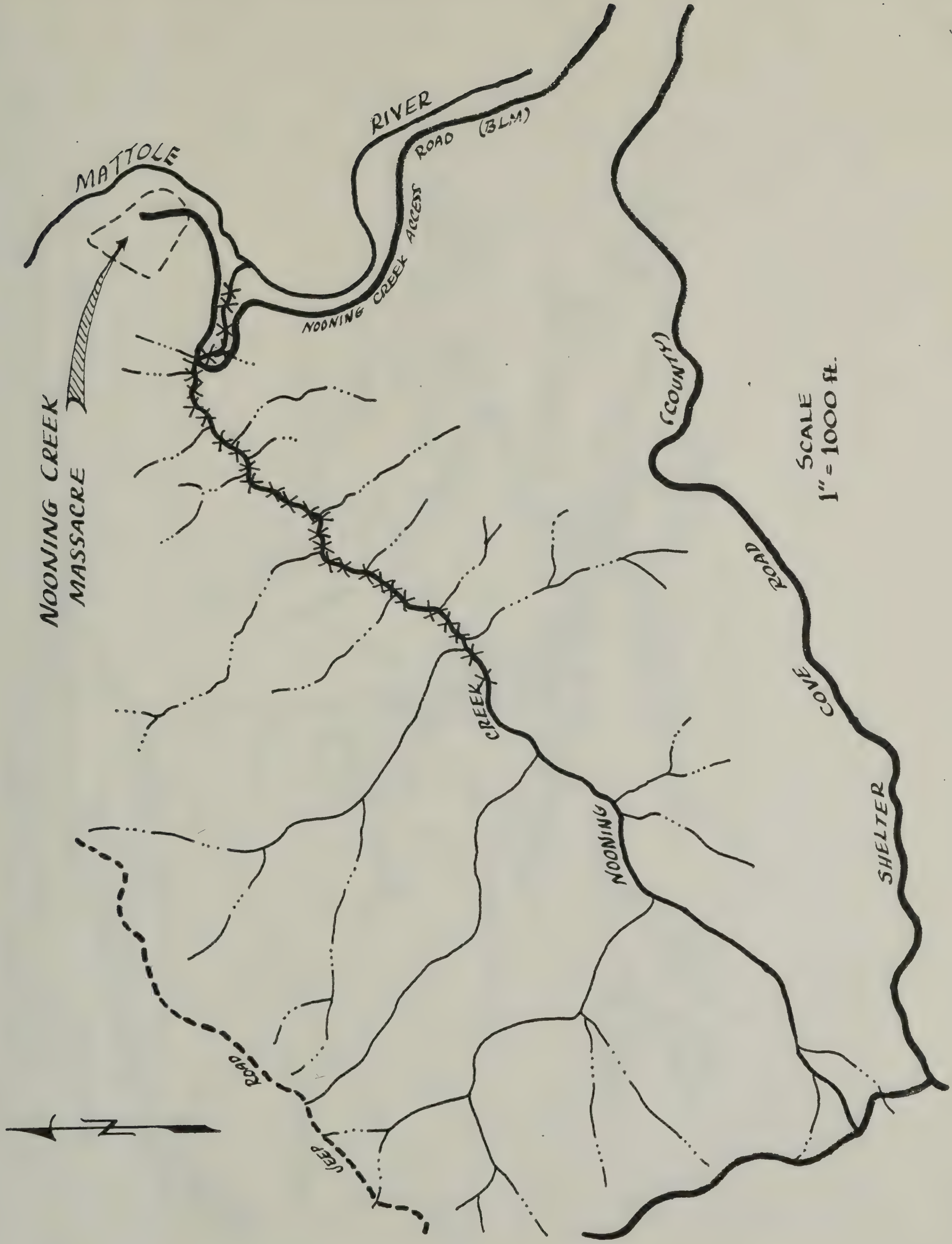


Figure 2: Locations (center of X) of 33 one hundred foot sections of Nooning Creek where rearing habitat will be increased (Action item A.).

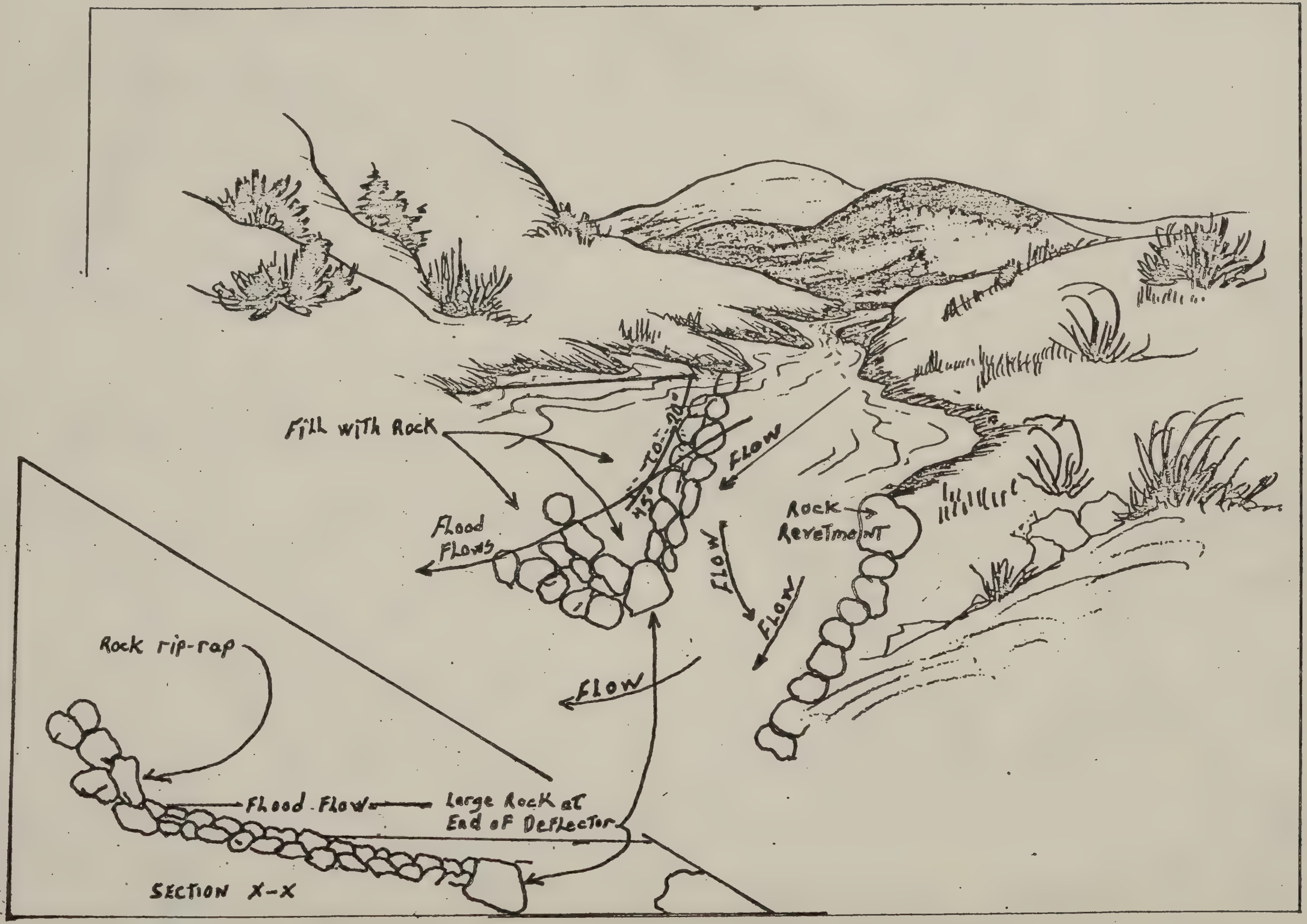


Figure 3: Typical rock deflector design for Nooning Creek. Deflected flow (current) will scour a deeper low flow channel.

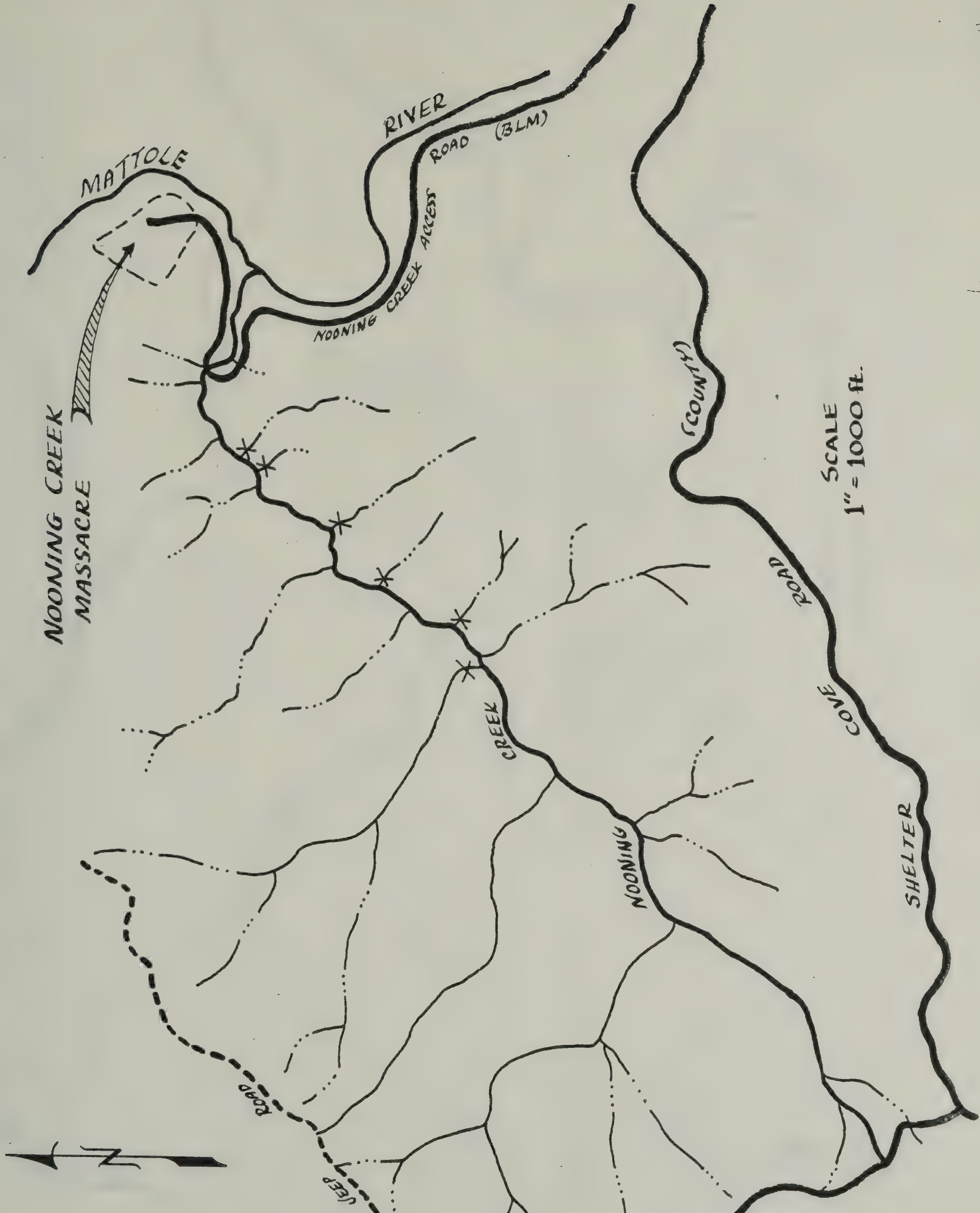


Figure 4: Locations (X) of tributary channel reclaiming work (Action item B).

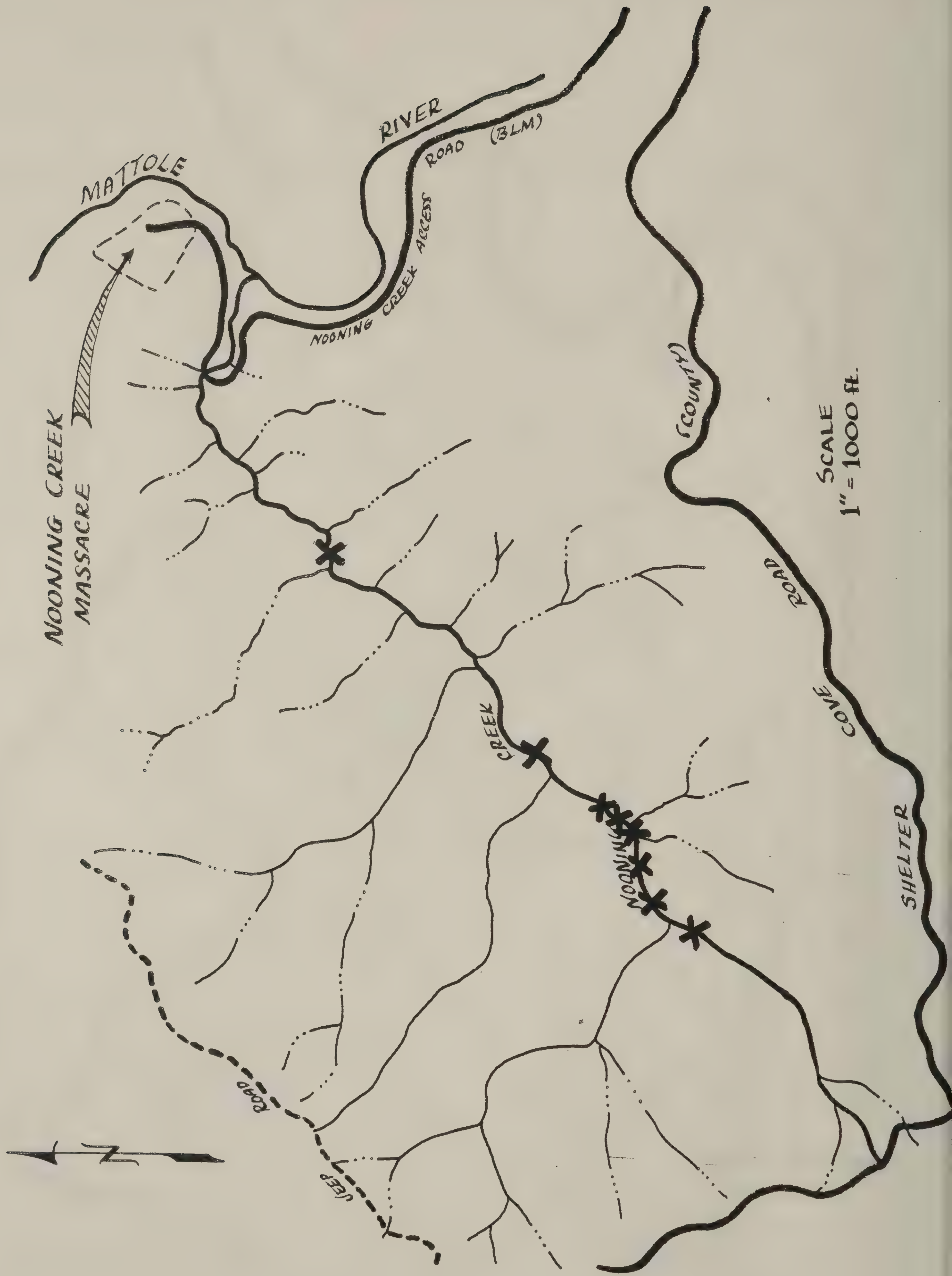


Figure 5: Locations (X) of woody debris which are deflecting stream flow into stream bank (Action item C).

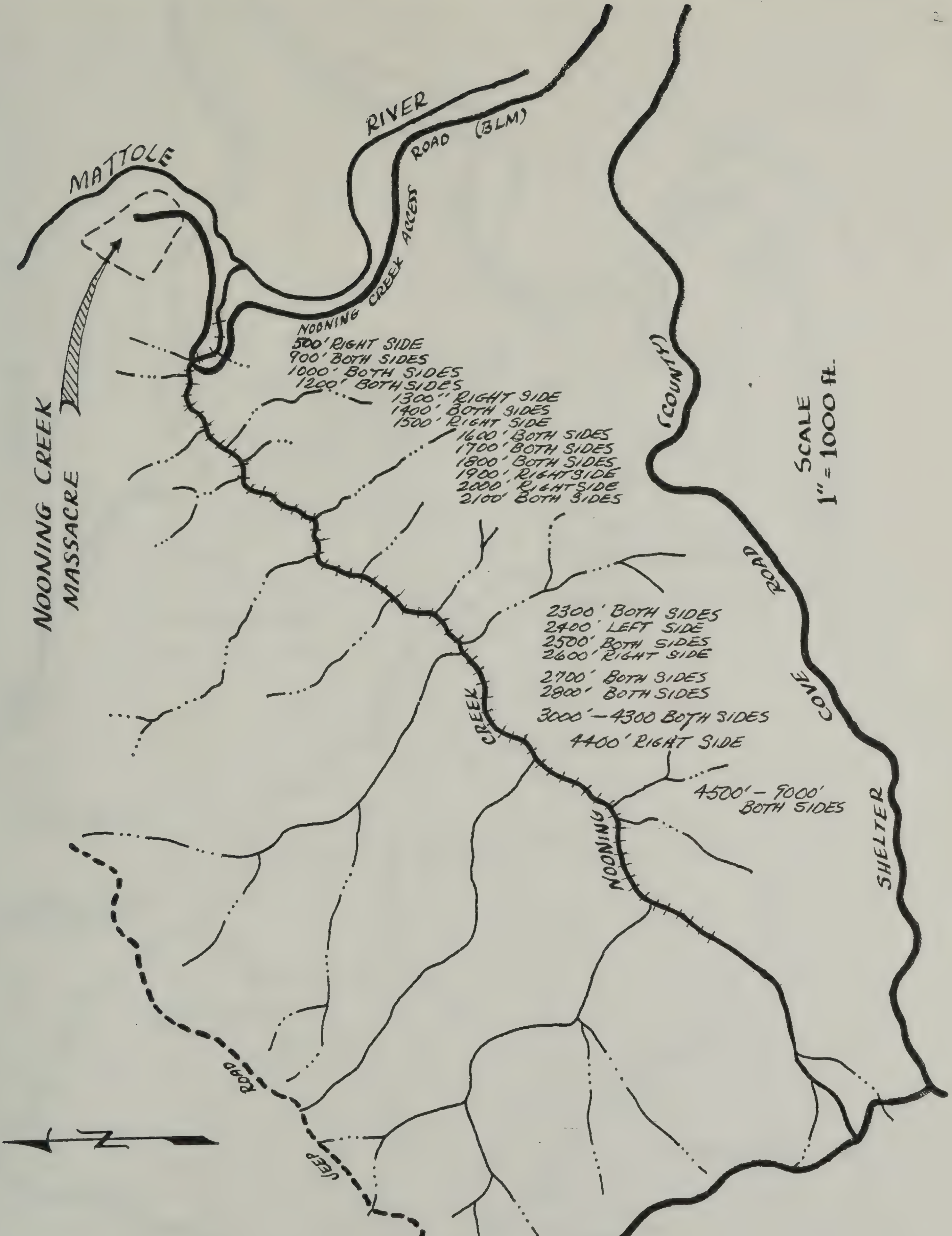


Figure 6: Locations of transplant and cutting planting areas (Action item D).

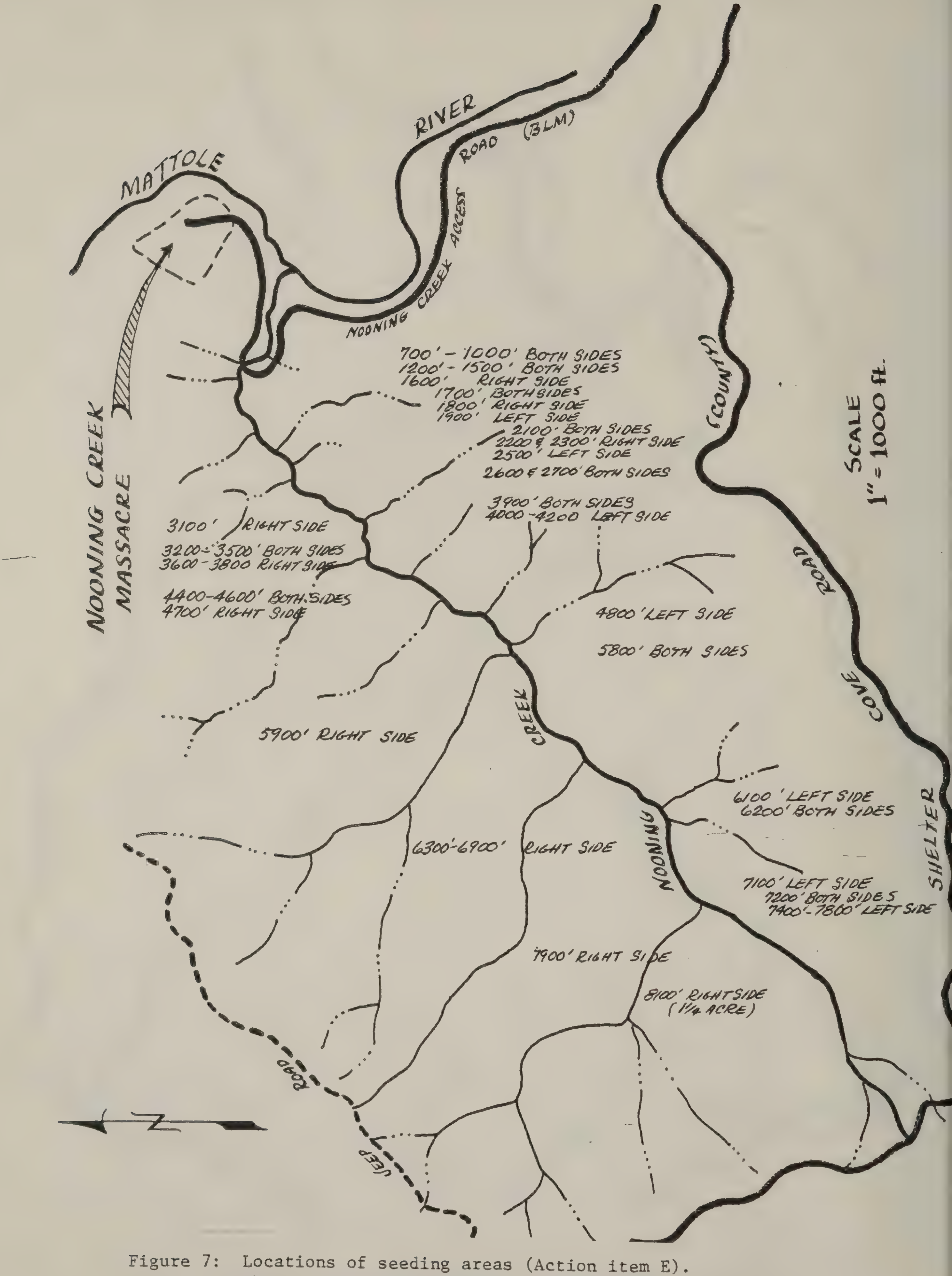


Figure 7: Locations of seeding areas (Action item E). Above is shown distance in feet upstream from mouth of Nooning Creek. Right side is right side when looking upstream.

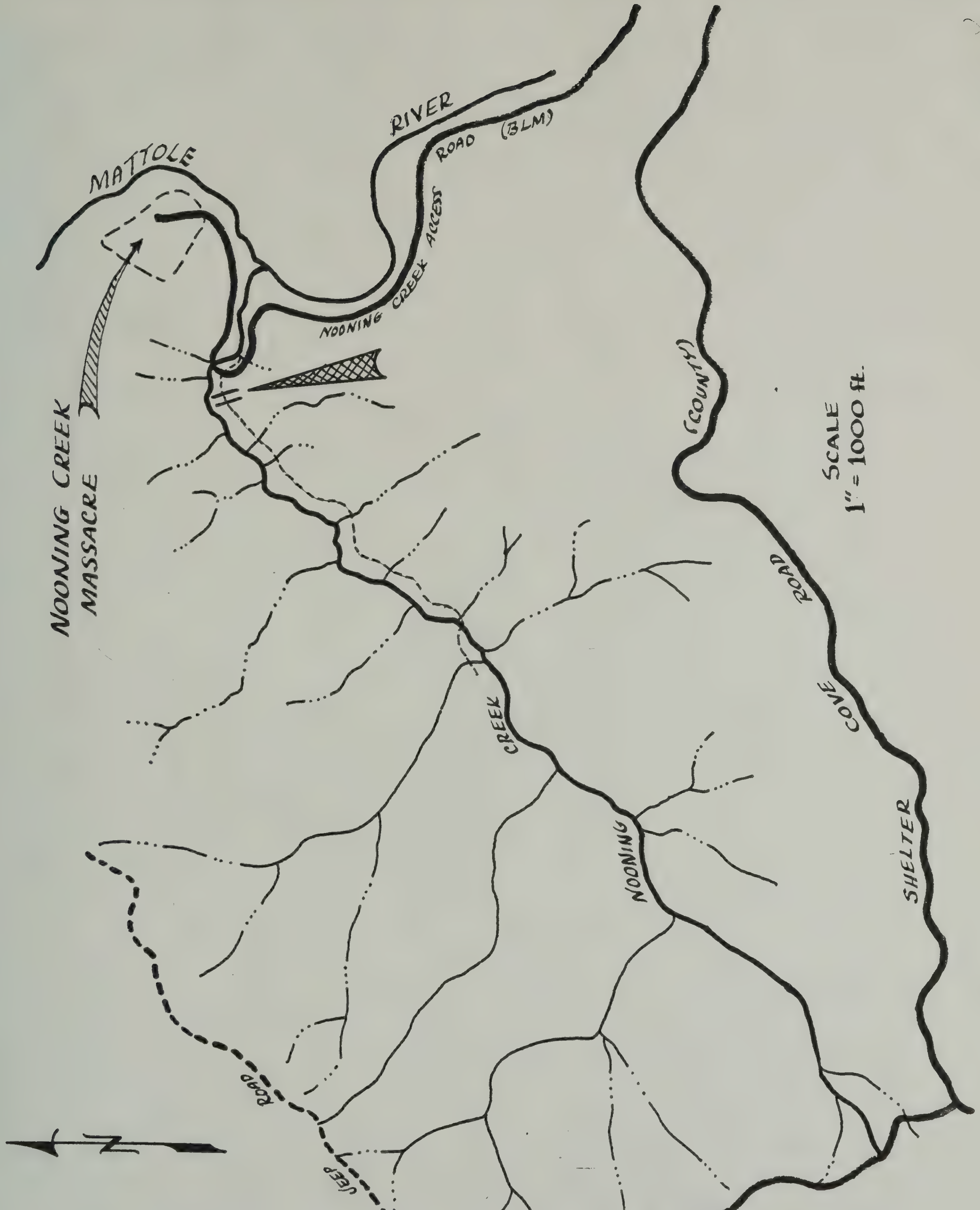


Figure 8: Location (=) of road vehicle barrier (Action item F).

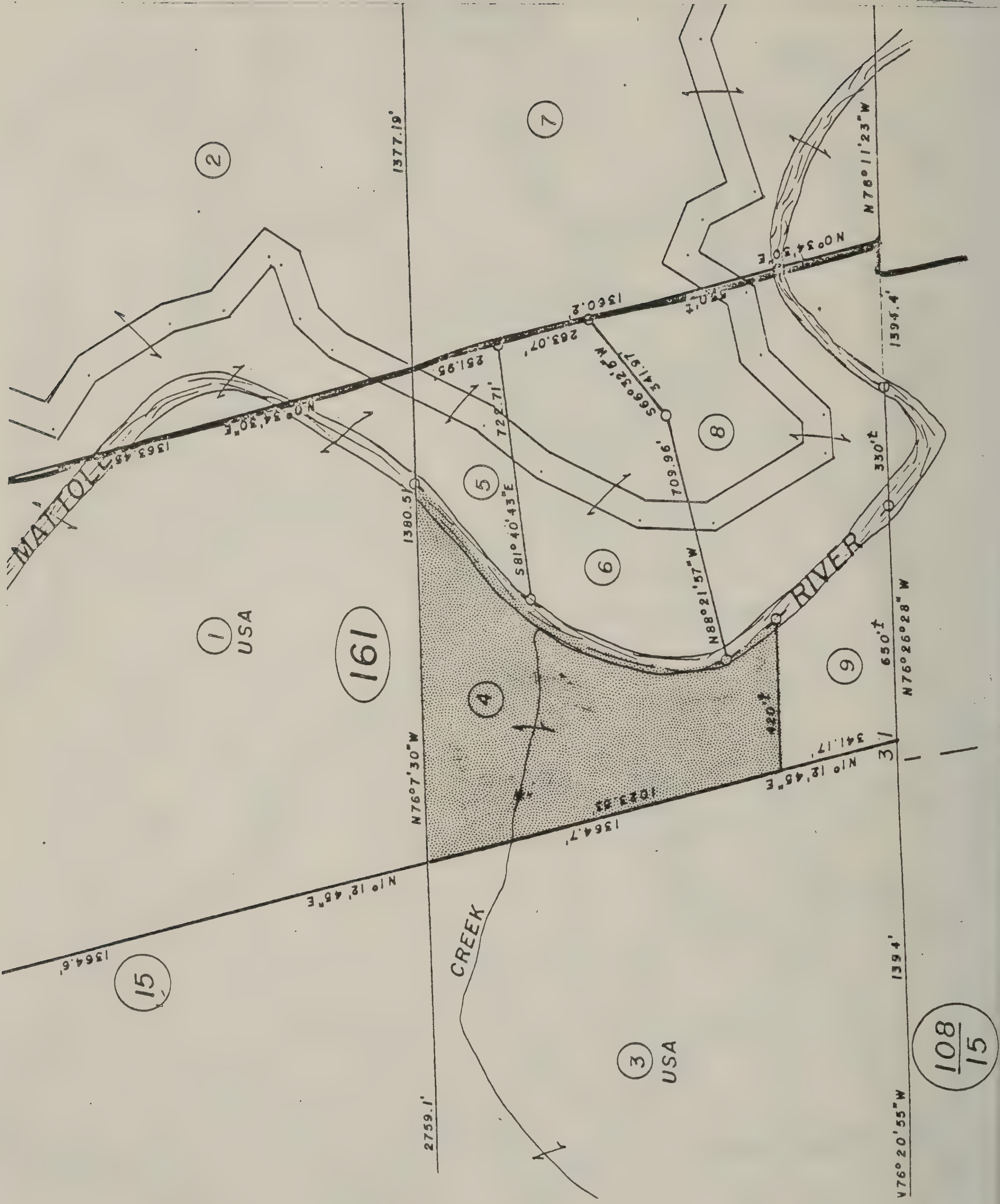


Figure 9: Location of the only private land along Nooning Creek. At present the landowner, Mr. Ernest McKee, is very supportive of stream enhancement work within the Nooning Creek.

APPENDIX B

Photos

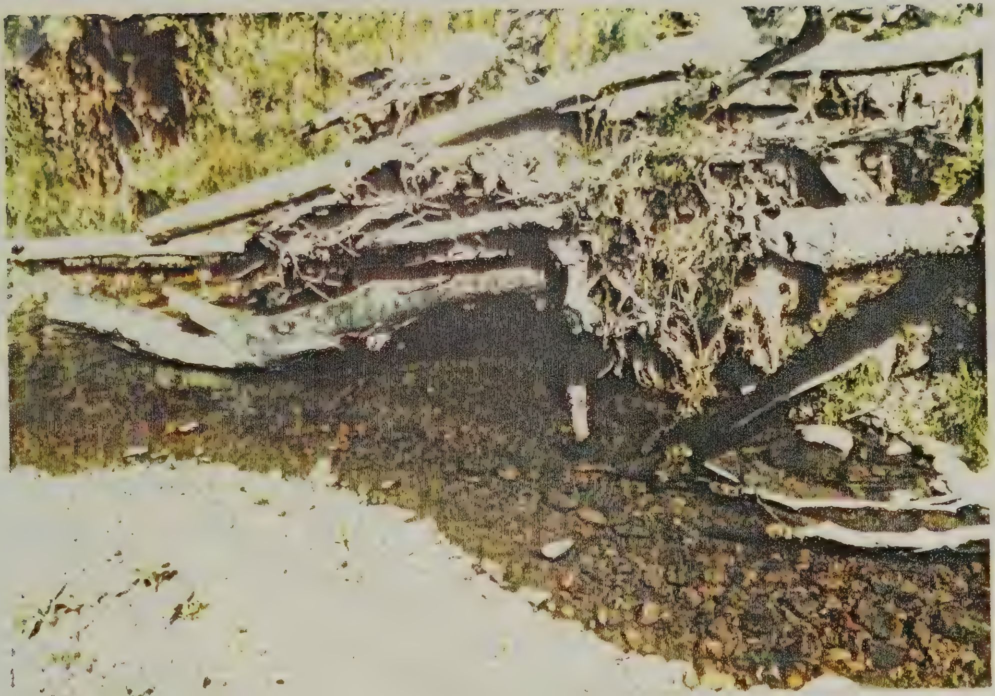


Photo 3: This streamside debris pile (constructed by C.C.C. crew 7/80) provides cover and holding areas for rearing steelhead and does not pose a barrier to upstream migrating adults. 1600' upstream from mouth of Nooning Creek (photo 9/2/81).

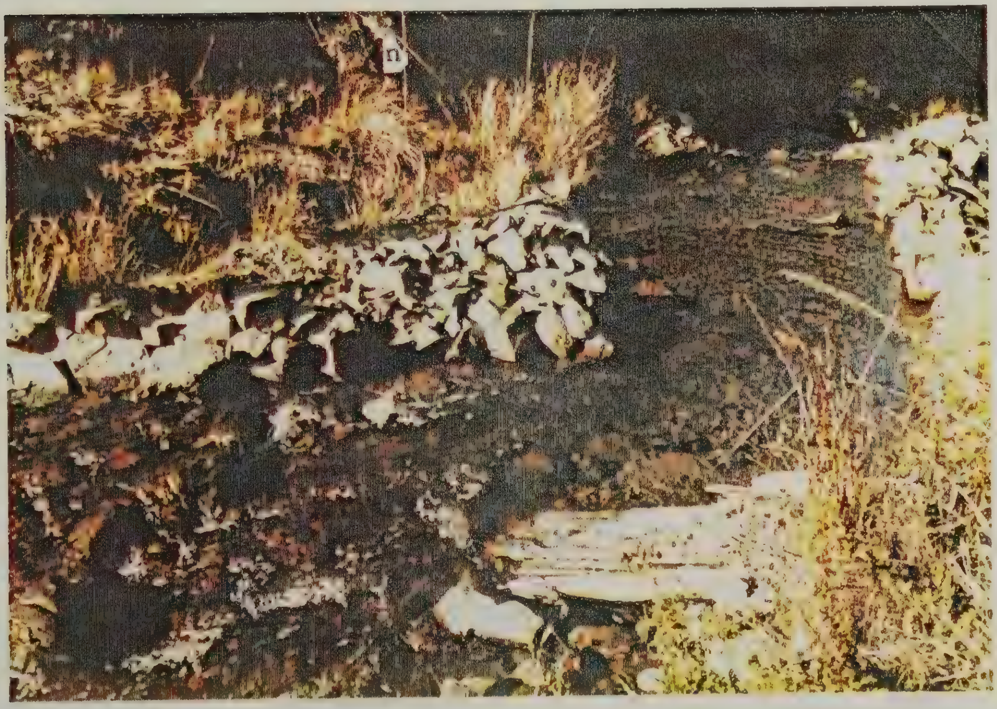


Photo 4: Rock deflector without log cover. Deflected current will scour a deeper low flow channel.

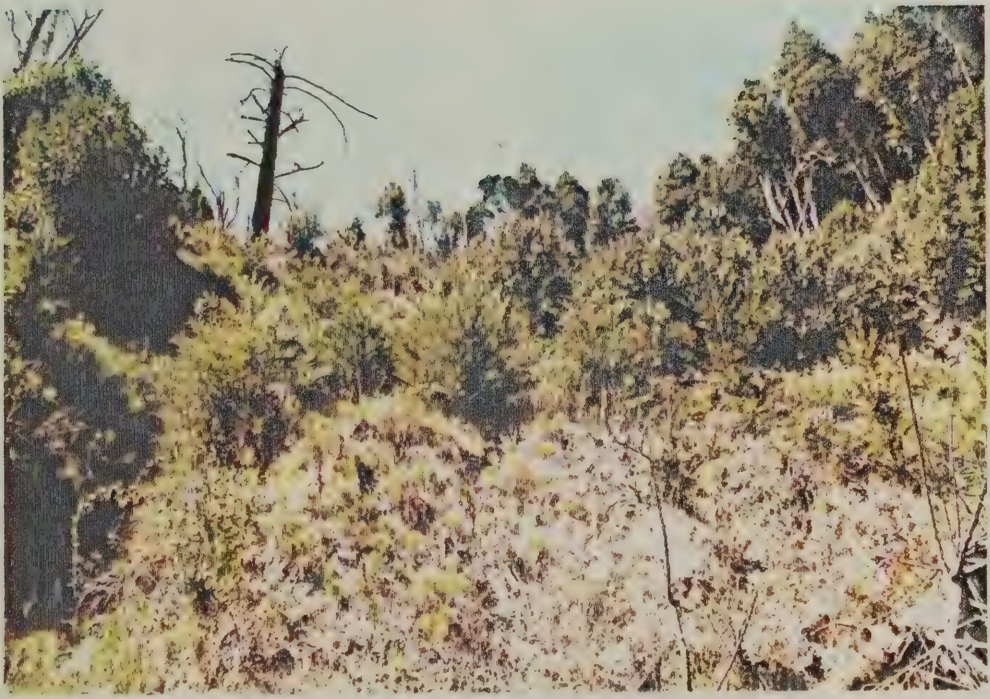


Photo 7: Oblique view (9/2/81) of right upslope at 4900' upstream of the mouth of Nooning Creek showing redwood transplants which were planted in 1976.

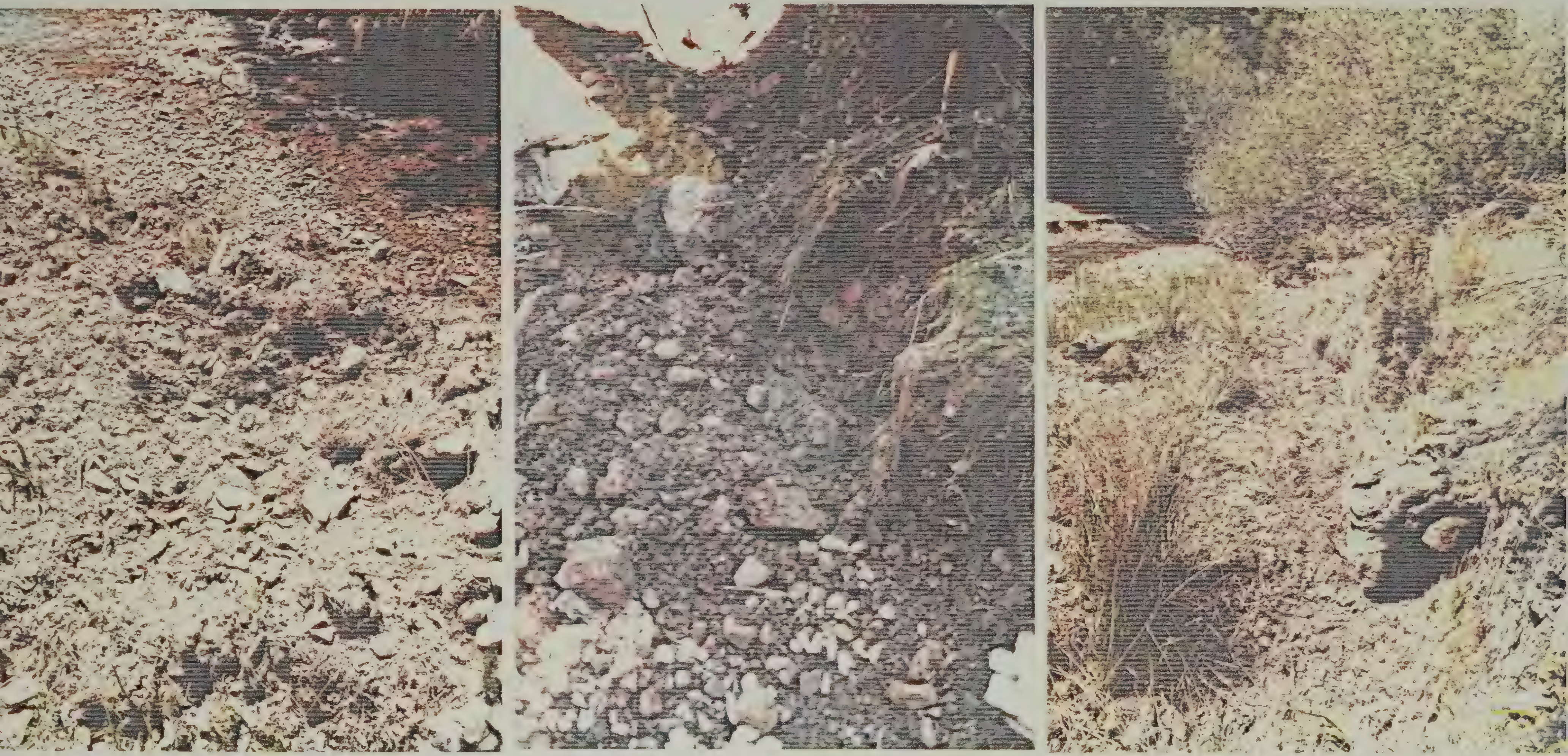


Photo 8, 9, 10: Feral pigs caused severe streambank erosion. Sand and silt entered the stream and damaged spawning and rearing areas. Bridge Creek (6/81) Sec. 7; NWNE T.5 S. E., 2 miles south of Nooning Creek.

APPENDIX C

Public Comment During Preparation
of
Nooning Creek HMP

Memorandum

DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

IN REPLY REFER TO:
1120/1608

TO : ~~District Manager~~, Eureka Resource Area Manager

Date: July 1, 1981

FROM : Barbara Gibbons, Acting Public Affairs Officer

SUBJECT: Public Involvement - Shelter Cove Public Meeting, June 30, 1981

Agenda: Preliminary Management Framework Plan (MFP) 3 decisions for the Scattered Blocks Planning Unit (Ernie Anderson) and Stream Enhancement Procedures, Nooning Creek Habitat Management Plan (Jim Decker).

Approximately 30-35 people gathered at the Shelter Cove Community Center to listen to the above presentations.

Anderson informed them that out of 250 tracts, BLM is proposing to concentrate its management efforts on six of the larger units, i.e, Lacks Creek, Larabee/Butte Creek/West Larabee, Jewett Rock, Gilham Butte, Iaqua Buttes, and Mad River, a total of 11,000 acres. He also told them that the remaining parcels would be managed on a site-specific basis, and the BLM is considering exchange or sale of the smaller parcels when such action would consolidate the larger units and benefit the public. A final decision on the management proposals for the Scattered Blocks Planning Unit will come from the Area Manager and District Manager around December 31, 1981.

Mr. Barnes, representing the District (?), apologized for the small turnout and accused the BLM of improper coordination of the meeting. Mr. Barnes also accused the BLM of "advertising untruth," referring to the King Range brochure. The brochure shows private property near Telegraph Creek as a BLM parking area. Anderson acknowledged this error and informed Mr. Barnes that the BLM is negotiating to purchase three parcels (about 1 acre) at the mouth of Telegraph Creek, which could solve the problem.

Fraces Aldridge, Shelter Cove Development Company, asked whether the BLM, if they acquire the parking area, would install toilets and whether the toilets would be flush type or chemical. She expressed concern about chemical toilets because the area is zoned commercial, and chemical toilets would not be compatible with commercial-type developments, e.g., restaurants.

Gene Brown, a commercial fisherman in the Shelter Cove area, complained about the Bureau's attitude towards the public. He said the BLM's attitude is bad and they (BLM) are leaving the public out of management activities. Brown said the public wants to be a part of public land management. He accused the Bureau of importing labor into the area when the local people would like the "$6.00/hour" we are paying people from outside the area.

Lucille Vinyard, conservationist, asked at what point the Bureau would put a road to bed. Vinyard said it seems that there could be a huge network of roads - some of them not producing any more timber.

The public asked for further hearings in the area. They seemed concerned about the CCC camp at Bear Creek. They feel the public (the affected community) should be involved in making these types of decisions.

Decker's presentation was well-received. The only concern expressed by a commercial fisherman in the audience was that fisheries personnel involved with planting fish should be concentrating their efforts on King salmon rahter than silver salmon.

Barbara Gibbon

IN REPLY REFER TO

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Eureka Resource Area
1585 J Street
Arcata, California 95521

RECEIVED
JUL 6 1981
BUREAU OF LAND MGMT.
EUREKA RESOURCE AREA

PUBLIC MEETING - June 30, 1981

AQUATIC HABITAT MANAGEMENT PLAN

Definition of
Objectives and Background
Authority
Policy

KING RANGE NATIONAL CONSERVATION AREA STREAM ENHANCEMENT
SLIDE SHOW

Slide show of enhancement techniques which may be applied in Nooning Creek and other KRNCA Watersheds.

Discussion of Nooning Creek Aquatic Habitat Management Plan and set date for orientation trip to Nooning Creek.

This is a very interesting presentation.
Some publicity would have brought out a larger audience. We didn't know about the meeting until Tues. afternoon!

Lillian Olsen
Shelter Cove Star Rte.
Whitethorn, Ca. 95489

CONSERVE AMERICA'S ENERGY

Save Energy and You Serve America!

July 30

[illegible] AUG 7 1981

BUREAU OF LAND MGMT.
[illegible] RESOURCE AREA

Hello-

Here are my suggestions for your Nooning Creek rehabilitation project. They are listed in order of priority.

1) Erosion control including both runoff control and revegetation

2) Spawning bed rehabilitation - either cleaning existing beds or creating new ones with gabions where appropriate. This ofcourse includes any necessary barrier removal, though I understand the barriers have already been removed.

3) Planting King Salmon eggs or fry where the natural run is too depleted to recover within one four year cycle.

Though I'm sure these points closely mirror your own plans, I appreciate your solicitation of public input.

Sincerely,

R.D. [illegible]

Shelter Cove Ca.

David Simpson
Mattole Salmon Group
Box 81
Petrolia, California 95558

Van Manning
District Manager
P.O. Box 940
Ukiah, California 95482

Dear Mr. Manning:

I am writing in regards to anadromous fish enhancement and rehabilitation in the Mattole watershed. Our organization, in conjunction with Coastal Headwaters and the Mattole Center for Science and Education, is involved in the early stages of a drainage-wide effort to restore native salmonid productivity, a job for which certain exemplary steps have already been taken by BLM in some tributaries flowing out of the Kings Range Conservation Area.

Our program this year consists of three parts. First, we are operating a small-scale hatchery operation utilizing native stocks and wooden incubating boxes placed at carefully selected tributary sites. Second, we have begun a valley-wide inventory of riverine resource condition with an eye toward known king salmon spawning and rearing areas. Finally, we are organizing an ongoing data storing and educational program to train and inform local participants as to survey skills, state-of-the-art enhancement and rehabilitation techniques and general necessary scientific background.

It is essential, owing to the relationship of the Conservation Area to the entire drainage, that information-gathering and planning functions of our operation and BLM's be closely coordinated. To date, Jim Decker, your Wildlife Biologist here has been extremely helpful and cooperative. He has been of significant service in helping to organize our survey and in the work of publicising to the valley population the possibilities for rehabilitation and fish restoration. His committment to these goals seems strong and abiding and we are greatful that he is available and urge your office to facilitate this availability on a continuing basis.

I think it is in order then, to close, that we congratulate BLM on their work in directions we hold in common and which have the support of the entire valley community here. We look forward to years of cooperation in the work ahead. Thank you.

Sincerely

David Simpson

THE MATTOLE CENTER FOR SCIENCE AND EDUCATION
P.O. Box 96 · Honeydew, CA 95545 · (707) 629-3389

August 22, 1981

[illegible]
AUG 2[illegible] 1981
BUREAU OF LAND MGMT.
[illegible] RESOURCE AREA

John Lahr, Area Manager
Northcoast Resource Area
Bureau of Land Management
Department of the Interior
1585 Jay Street
Arcata, CA 95521

Dear Jack,

I am writing this letter in appreciation for the cooperation that you and your staff members at BLM have shown regarding fisheries enhancement and watershed rehabilitation projects in the Mattole region. I feel it is essential that local residents and public agencies work together on projects of this sort. This is especially true for watersheds such as the Mattole, in which there are significant public land holdings (in this case, primarily the King Range National Conservation Area).

It appears that the public lands offer the best and most managable fish habitat in the watershed, and I'm pleased with your commitment to the management of this resource. I think it would be very valuable if there could be some joint management plans developed for specific Mattole tributaries and possibly for the entire watershed. As you probably know, we have begun drafting a stream survey plan for the Mattole watershed, and it might be one useful starting point for cooperative agreements.

Again, I appreciate very much your willingness to engage in cooperative involvement with local residents. Your attitude is exemplary for public agencies working for the public good. I look forward to a continued productive relationship with BLM. Warm regards.

Sincerely,

J E Erwin

J. Erwin, Ph.D.
Director

copies: Van Manning, Manager, Ukiah District, BLM
Jim Decker, Wildlife Biologist, NRA, BLM

APPENDIX D

Comments on Draft Plan

Send copy
to: D.M Ukiah

CALIFORNIA TROUT

KEEPER OF THE STREAMS

J. Decker
Congratulations!
Jack 3/12/82

MAR 11 1982
BUREAU OF LAND MGMT.
EUREKA RESOURCE AREA

March 8, 1982

John W. Lahr, Area Manager
U. S. Department of the Interior
Bureau of Land Management
1585 J Street
Arcata, California 95521

Dear Mr. Lahr:

With great pleasure we have reviewed the Draft Nooning Creek Aquatic Habitat Management Plan. The BLM and affiliated agencies and and local groups are to be congratulated for recognizing the problem and producing a sound, innovative far-sighted plan. This Plan should serve as a model for watershed restoration in the many other areas where anadromous fish populations have declined as a result of habitat destruction. There is here an opportunity to provide leadership and scientific data for improved resource management. Your interdisciplinary approach is especially appealing.

One of Cal Trout's major goals is protection and restoration of native salmonid stocks, and we firmly believe this goal can be reached only by habitat protection and restoration. Hence we applaud the Nooning Creek Plan and trust it will be fully funded and implemented to include long-term systematic monitoring.

Meanwhile, please keep us informed of your progress.

Yours very truly,

Herbert L. Joseph, M.D. Chairman
Steelhead Committee
1516 Napa Street
Vallejo, Ca 94590

HLJ/aj
CC: Naylor
May
Mattole Center for Science & Education

P.O. BOX 2046 · SAN FRANCISCO, CA 94126

AK00

EPIC

Environmental Protection
Information Center, Inc.

P.O. Box 397
Garberville, CA 95440
Office in Ruby Valley

12 March 1982

Van Manning, District Manager
Bureau of Land Management
555 Leslie Street
Ukiah, California 95482

Dear Van,

We have reviewed the Draft Nooning Creek Aquatic Habitat Management Plan and this letter is to express our view of that project plan.

Congratulations! It is excellent. We are very pleased that the Ukiah District is undertaking this very important work, and we are strongly hopeful this project is a harbinger for other habitat restoration work in our area. We firmly support such projects not only because of the important benefits to habitat but also because we believe there are very important people benefits in them as well.

My reading of this report does raise for me one particularly important concern which I'd like to bring to your attention. We have toured the Nooning Creek watershed and fully agree there is considerable need for this rehabilitation. We agree with the report that such work is costly. But we would also note the obvious: that the damage that has been done to Nooning watershed has been costly not just in rehab dollars but even more so in other ways such as irreplaceable soil loss and permanent damage to site productivity. All of these vast losses so well pointed up by this project were very largely avoidable. We understand the Nooning watershed damage occurred mainly prior to BLM stewardship there, and that the damage there derives in no small part to outmoded forestry practices. Yet, I and several other EPIC members have also toured some recent BLM forestry operations at Red Mountain which raise for us the concern that BLM is still not yet making a full effort to contain these same important externalized costs. Therefore, we suggest you make a greater effort to impress upon your forestry staff the importance, as well as the cost efficiency, of containing these long-term effects at the source. It's the old lesson that an ounce of prevention is worth a pound of cure. We hope many people will have the opportunity to more fully appreciate that lesson from this important project.

DEPT. OF THE INTERIOR
[illegible]
MAR 19 1982

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One further aspect of the foregoing I feel deserves brief mention. Over my years of contact with the Ukiah District, I have seen what appears to be a history of isolation between projects, among successive workers, and between disciplines within the District. We'd like to see more coordination between, say, foresters and biologists, so that there will be a better exchange of insight and experience. In the present case the biologist has a better insight of the watershed effects which are entrained in time, but then a forester might here be able to advise, say, that permanently closing the road, as recommended in the report, is unwise given the likelihood of eventual reentry for further timber harvest. By this one example I'm hoping you may see that enhanced communication within the District would increase long-term efficiency, as well as benefit the environment.

In addition to the above general comments, we have three specific concerns about the project which we'd like to share with you:

1) We are concerned that any introduction of coho salmon be made only from Mattole River stock.

2) We strongly urge that all seed for the various prescribed plantings, except perhaps for grass seed, be gathered either on site or from nearby lands, and that no seed other than grass seed be purchased.

3) We agree that "naturalized" plants may be useful. However, the report suggests an untoward standard for what is "naturalized". Pines, for example, cannot reasonably be regarded as naturalized in that area and we would object to their use, so we're glad redwoods are to be substituted. Also, we would object to the use of non-native plants which, though somewhat established in our area, should be regarded as noxious. These include, among others, scotch broom and pampas grass. Also, if this plan is to be a model for other area projects, we request that no non-natives, whether "naturalized" or not, be used in designated or candidate wilderness areas (we recognize this is not applicable to Nooning Creek).

In closing we again express to you and your able staff our sincere enthusiasm for this excellent project. Please keep up the fine work.

Best regards,

Woods

ROBERT SUTHERLAND, President.

cc: Jack Lahr, Jim Decker

THE MATTOLE CENTER FOR SCIENCE AND EDUCATION
P.O. Box 96 · Honeydew, CA 95545 · (707) 629-3389

March 24, 1982

MAR 26 1982
BUREAU OF LAND MGMT.
RESOURCE AREA

John Lahr, Area Manager
North Coast Resources Area
Bureau of Land Management
Arcata, CA 95521

Dear Jack,

I recently received the draft "Nooning Creek Aquatic Habitat Management Plan" by James Decker. I have examined it very carefully and am quite impressed with its scope and innovative but practical techniques for restoring or improving anadromous fish habitat in Nooning Creek.

In my opinion, Decker's plan can be a useful model for comprehensive management of other creeksheds in the Mattole Basin and other areas. The multifaceted approach detailed in this plan is especially important. I hope this plan will be fully implemented and that there will be a full commitment to evaluation of the long-term consequences of these important techniques. The value of this project can be very extensive as a fully documented demonstration project.

As you know, there are several projects in the Mattole region aimed at fisheries enhancement. There is strong public sentiment in favor of these projects and much credit for leadership must go to you and Jim Decker. Your efforts are recognized locally as exemplary programs of government agencies acting in the public interest. Keep up the good work!

Sincerely,

J. E. Erwin

J. Erwin, Ph.D.
Director
Mattole Center for Science and Education

STATE OF CALIFORNIA—RESOURCES AGENCY
EDMUND G. BROWN JR., Governor

DEPARTMENT OF FISH AND GAME
P. O. Box 1480
Redding, CA 96099
(916) 246-6511

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APR 13 1982
BUREAU OF LAND MGMT.
EUREKA RESOURCE AREA

April 8, 1982

Mr. John W. Lahr, Area Manager
Bureau of Land Management
Arcata Resource Area
1585 J Street
Arcata, CA 95521

Dear John:

We are sorry for the delay in reviewing your draft report of the Nooning Creek Aquatic Habitat Management Plan. Because of recent personnel changes more time was needed to let those concerned with the project have an opportunity to review the report.

The plan is well laid out and is quite specific as to scheduling, implementation, and methods to be followed. The project does involve Department employees and we should be able to provide some assistance, provided we are not under travel restrictions.

The flow deflectors mentioned under Methods (Page 6-b) are designed to withstand a moderate storm event. It would be helpful to know the size and frequency of a moderate storm event since it will have a bearing on how often the deflectors must be repaired or replaced. If the material is available, it may be worthwhile to build the deflectors to withstand a 50-year flood.

The chapter on Environmental Consequences (IV Page 15) includes temporary impacts on wildlife but does not mention possible temporary adverse impacts on fish and aquatic invertebrates while instream work is being conducted.

Thank you for the opportunity to review the Nooning Creek Management Plan. This habitat improvement project should make a valuable contribution to the salmon and steelhead resources of the Mattole River system.

Sincerely,

Spike

A. E. Naylor
Regional Manager, Region 1

STATE OF CALIFORNIA – RESOURCES AGENCY
EDMUND G. BROWN JR., *Governor*

CALIFORNIA CONSERVATION CORPS
1530 Capitol Avenue, Sacramento, CA 95814
(916) 445-8183
201 Project
P.O. Box 176
Weott, CA 95571
(707) 946-2362

RECEIVED
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EUREKA RESOURCE AREA

March 25, 1982

John W. Lahr, Area Manager
U.S. Department of the Interior
Bureau of Land Management
1585 "J" Street
Arcata, CA 95521

Dear Mr. Lahr,

The Nooning Creek Aquatic Habitat Management Plan prepared by James Decker offers several opportunities for C.C.C. 201 work crews to assist in its implementation if the California Department of Fish and Game decides that the work falls under the 201 Project guidelines.

Mr. Decker lists improving "the quality of aquatic habitat . . . by rehabilitation of damaged areas" and increasing "the quantity of habitat for anadromous fish by removing barriers to their migrations," as goals of the King Range National Conservation Area Management Program. As the backlog of stream clearance projects is reduced, Elton D. Bailey, Fisheries Management Supervisor, Region I, has suggested that C.C.C. 201 crews might work on the following methods to rehabilitate nursery streams and improve native anadromous fish stocks; instream nursery habitat enhancement, riparian planting, erosion control and streambank stabilization, spawning riffle rehabilitation, fish rearing and installing fish passage culverts on county roads.

Sincerely,

Doyle Metheny
Ranger II
Doyle Metheny

Melvin Kreb
Center Director, 201 Project
Melvin H. Kreb

United States Department of the Interior

NATIONAL PARK SERVICE
REDWOOD NATIONAL PARK
ARCATA OFFICE
P.O. BOX SS — 791 EIGHTH STREET
ARCATA, CALIFORNIA 95521

IN REPLY REFER TO:
N16

RECEIVED
APR 06 1982
BUREAU OF LAND MGMT.
EUREKA RESOURCE AREA

April 5, 1982

Mr. John W. Lahr, Area Manager
Bureau of Land Management
Arcata Resource Area
1585 J. Street
Arcata, California 95521

Dear Jack:

We have received your Draft Nooning Creek Aquatic Habitat Management Plan. The plan is complete and comprehensive with objectives clearly stated. We are especially pleased to see the type of instream fisheries enhancement work you propose. We feel such measures are most cost-effective.

For your information we have been planning to develop a similar Aquatic Resources Enhancement Plan for one of the streams in Redwood National Park. Your plan will be a useful model and guide for that effort.

Thanks for the opportunity to comment on your plan. If you have any questions please call either myself or Terry Hofstra at (707) 822-7611.

Sincerely,

L. Lee Purkerson

L. Lee Purkerson
Chief, Technical Services Division

Year of the Visitor

APPENDIX E

Preparation and Review Checklist

Form 6780–1
(July 1981)
(formerly 6620–1)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

CHECKLIST FOR PREPARATION AND REVIEW OF HABITAT MANAGEMENT PLANS

State California

District Ukiah

Resource Area Eureka

HMP Name and Number Nooning Creek

HMP Prepared by James A. Decker

REVIEW CHECKLIST	SURNAME	DATE
1. Master Memorandum of Understanding, Sikes Act Agreement and/or Supplemental with State Agency.	▨	01/17/69
2. Preliminary meeting(s) with State Agency *(or other appropriate cooperators)* to jointly discuss HMP objectives.	▨	01/16/81
3. Endangered Species Act Compliance completed by	Decker	10/05/81
4. Review by District/Resource Area Specialists		
Range	N/A	
Wild Horse and Burro	N/A	
Hydrologist	Ritchey	01/14/82
Forestry	Swensen	
Fisheries/Botanist/Wildlife Biologist	Yull/Johnson/Decker	01/14/82
Lands	Anderson	11/81
Minerals		
Recreation	Cann	11/81
Wilderness/ACEC	Whitmarsh	01/14/82
Cultural	Rumpe	01/12/81
Visual	Whitmarsh	01/14/82
Environmental Coordinator *(reviews EAs)*	Julius	01/15/82
Support *(Chief of Operations/Fire Management)*	Scheffy	01/14/82
Others		
5. Reviewed by Area Manager	Lahr	01/08/82
6. Reviewed by Chief of Resource Management	Verner	01/14/82
7. Draft HMP and EA reviewed by State Agency authorized officer *(or other cooperators).*	Naylor	04/08/82
8. Final review *(if appropriate)* by State Director		
9. Reviewed and approved by District Manager	Manning	09/24/82
10. Approved by State Agency authorized officer		

Remarks

✱ U.S. Government Printing Office: 1981-780-779/692 Reg 8

APPENDIX F

Environmental Analysis record

ENVIRONMENTAL ASSESSMENT

NOONING CREEK WATERSHED AQUATIC HABITAT MANAGEMENT PLAN

No. CA-056-WHA-A1

Chapter I.

PURPOSE AND NEED FOR ACTION

(see AHMP Section I. B.)

Chapter II.

DESCRIPTION OF PROPOSED ACTIONS AND ALTERNATIVES

A. DESCRIPTION OF PROPOSED ACTIONS

(see AHMP Section III. A.)

B. ALTERNATIVES

1. No Action Alternative

The no action alternative would perpetuate the existing situation. The Bureau is directed by the Sikes Act of 1960 (as amended 1974 (88 Stat. 1369) and 1978 (92 Stat. 921)) to "...plan, develop, maintain and coordinate programs for the conservation and rehabilitation of wildlife, fish and game." In addition the Federal Land Policy and Management Act of 1976 (90 stat. 2743) identifies fish and wildlife as one of the major uses of public alnds. If this alternative is selected for the Nooning Creek Watershed, anadromous fish (steelhead and salmon) and other natural values are expected to be adversely impacted. Therefore, this alternative is not considered viable.

2. Limited Enhancement Using Manual Labor Only

This alternative would have only limited benefits in that not all action items could be completed. Costs would be substantially higher due to intensified efforts.

C. MITIGATION

No additional mitigation of environmental effects are proposed beyond those implied in the design specifications (proposed actions).

CHAPTER III

AFFECTED ENVIRONMENT

A. Present Situation

1. Geology and Topography (see King Range U.R.A. 1974)

The proposed watershed enhancement work is located within the North Coast Physiographic Province of Northern California. The area is characterized by a series of northwest-southeast trending ridges and valleys influenced by the structural trend of the area. The major rock type in the area is a hard sandstone (called Graywacke) with interbedded shale. The graywacke is generally fairly stable on slopes, but the addition of interbedded shale lenses decreases stability substantially.

The enhancement work is approximately 5 miles east of the San Andreas Fault. The entire area has been highly sheared, folded, and contorted, which makes the geology extremely complex.

No mineralization or mining activity is known to exist within the Nooning Creek Watershed.

Several landslide features (embankment washouts) were observed in the watershed which indicate the potential for landslide activity throughout the area.

2. Soils (see King Range U.R.A., 1974)

Most of the soils of the area have been mapped as Hugo. There are also some Los Gatos soil areas on south facing slopes in the northwest corner of the watershed. Parent materials are sandstone and shales.

The erosion hazard is moderate to high. Evidence of past erosion can be seen in roadside ditch erosion, rills on cut and fill slopes, and cross drain gullying.

3. Water Resources (see King Range U.R.A., 1974)

Average annual precipitation in the vicinity of Nooning Creek Watershed is between 80 and 90 inches, typically occurring during relatively few, very high intensity winter storms.

Storms may be of such intensity that even fully vegetated, undisturbed surfaces, whose infiltration capacity is quite high, cannot accomodate the total rainfall produced by a given storm event. Consequently, the potential for siltaccumulating surface runoff to either: a) enter streams, or b) stimulate mass movement events which in turn deliver great quantities of soil materials to streams, is relatively high, especially given the very steep quality of the topography, incompetent graywackes, shale lenses, seismic instability, etc.

Most of the watershed has been tractor logged within the last two decades. Poorly engineered roads and skid trails have densely scored the terrain and serve to impede infiltration and channel surface runoff greatly exacerbating natural tendencies toward mass movement and depositions of soil materials into Nooning Creek.

The general pattern for the Franciscan Formation is repeated here, at close to its extreme case: 1) Intense summer drought and periodic fire maintain low vegetation density (for such a high annual precipitation) and a high proportion of bare ground. 2) Intense winter storm events produce high erosional pressure against sparsely vegetated surfaces. 3) Terrain is highly unstable geologically and topography is mature. These factors combine to produce: a) Extremely high background erosion rates resulting from surface runoff and mass movement, and b) extremely high potential for man-induced acceleration of erosion.

4. Vegetation

Fire has played a dominant role in the developmental ecology of the vegetation in Nooning Creek Watershed. The entire watershed burned relatively recently (1973) and catastrophically. Logging, both before and after the fire, has removed an important percentage of the Douglas-fir overstory and stimulated the creation of only a few young mixed stands in the process of segregating into distinct canopies. Shrubs and herbs are much more prominent than was the case before disturbance. Although large old growth conifers survive such fires and play the role of seed trees to establish coniferous regeneration. This was not the case on the Nooning Creek Watershed. Hence, mostly hardwood, shrub, and herb regeneration is found.

Approximately 95% of the streamside vegetation in the drainage has been removed, mostly due to road building and tree-to-tree logging method.

In summary, the vegetation presents a chaotic and unstructured appearance, although nothing is obvious that one cannot find anywhere for miles around.

There are no rare, threatened, or endangered plants within the watershed. One listed plant, *Pityopus californicus* (rare), has been discovered within the Big Finley Creek Watershed which is the watershed north of the Nooning Creek Watershed.

5. Wildlife

a. Terrestrial

Wildlife associations are determined primarily by vegetative types. Vegetation communities in which the proposed enhancement work is to be done are chaparral, grassland, and mixed evergreen forest. Due to this variability of vegetative communities, one might expect to find examples of almost all wildlife species known to occur in the Mattole River basin.

Herptiles: 29 species

Species area status undetermined.

No official listed status for any of these species.

Mammals: 28 species common to area.

31 species area status undetermined.

No official listed status for any of these species.

Birds: 63 species common to area.

36 species area status undetermined.

3 species uncommon in area; occurring but no known nest and roost sites in watershed.

1. Bald Eagle (*Haliaetus leucoephalus*) Endangered, winters in King Range, but only winter fly-by for Nooning Creek.
2. Osprey (*Pandion haliaetus*) Sensitive (U.S.F.S.), present overhead but not believed to be utilizing the Nooning Creek Watershed.
3. Spotted owl (*Strix occidentalis*) Sensitive (U.S.F.S.), present overhead and may be feeding in the watershed.

b. Aquatic

Field identification of larger fish (Scott and Crossman, 1973) and laboratory examination of young of the year (YOY) fish electroshocked in April, 1981 indicate that only one species of fish, *Salmo gairdnerii* (steelhead - rainbow trout) is present at this time in Nooning Creek Watershed.

Distribution of these fish were found to extend 2.44 kilometers (to above the 1,200 ft. elevation) from the confluence with the Mattole River. Population estimates expressed in terms of fish per kilometer and total fish are presented in Table I. No rare or endangered fish species are present in Nooning Creek.

TABLE I

Estimated minimum populations of steelhead - rainbow trout, expressed in fish/km and total fish, Nooning Creek, King Range National Conservation Area, Northern California, 1981.

	#Sections Sampled	Mean # Fish/km	Observed Distrib. (km)	Total Fish to Upper Limit
4/24 & 25	n = 9	1+ 320	2.44 (+1,200 elev. to mouth)	783
	n = 10	YOY 5170.6		12,616.3
	n = 10	TOTAL 5132.5		12,523.3
6/25 & 26	n = 4	1+ 262.5	2.44	640.5
	n = 3	YOY 1924.76		4,696.4
	n = 3	TOTAL 2143.47		5,230.1

Forty three 100 foot sections of Nooning Creek which are being considered for stream enhancement were rated in August, 1981 in terms of percentage of optimum trout habitat (Priority A limiting factors as in Duff and Cooper, 1978). Ratings for individual sections are presented below:

Section	% of Optimum	Section	% of Optimum	Section	% of Optimum	Section	% of Optimum
7B	30.4%	3A	30.0%	13A	33.0%	25A	33.6%
6B	36.6%	4A	35.0%	15A	42.6%	26A	34.8%
5B	69.0%	5A	38.0%	16A	40.0%	27A	35.6%
4B	32.2%	6A	33.0%	17A	52.8%	28A	51.0%
3B	63.2%	7A	48.0%	18A	41.8%	29A	54.4%
2B	40.4%	8A	56.0%	19A	34.6%	30A	34.2%
1B	48.6%	9A	33.0%	20A	41.2%	31A	35.0%
Bridge	55.0%	10A	32.4%	21A	36.1%	32A	37.8%
1A	44.0%	11A	35.6%	22A	35.2%	33A	30.6%
2A	30.0%	12A	42.2%	23A	58.2%	34A	70.0%
				24A	35.8%	35A	35.2%

These ratings in general are very low with no sections receiving ratings of greater than 70% of optimum and all but ten sections being rated at less than 50% of optimum habitat. The ability of these sections in their present state to contribute to production of steelhead trout appears extremely low. Habitat modification and related enhancement activities would greatly improve these ratings and the related production of 1+ steelhead - rainbow trout.

6. Cultural Resources (Archaeologist Report Stream Rehabilitation Projects, 1980).

The Nooning Creek Watershed was checked for possible environmentally sensitive areas which may contain cultural resources. The only visible areas appear to be the result of disturbance.

No known archaeological, paleontological, historical, or Native American sites occur within the enhancement sites.

7. Visual Resources

The proposed watershed enhancement work generally follows extensively disturbed areas within the Nooning Creek Watershed. Abandoned logging and skid roads in the watershed are visible from the Shelter Cove Road and the Paradise Ridge Road. And from the creek itself, anyone could sketch a more or less classical introduction to the problem of poor timber harvest practices. Most of this occurred prior to BLM acquiring the land from private land owners.

8. Land Uses

a. Wilderness

The wilderness inventory, BLM Ukiah District, the Nooning Creek Watershed was not included within any roadless area proposed for wilderness study area designation.

b. Flood Plains and Areas of Critical Environmental Concern (ACEC)

The proposal is not located within a flood plain, nor does it potentially affect one downstream. There is no indication that anything which might ultimately be included within an ACEC is located within the vicinity of the proposed project or the vicinity of downstream effects.

B. Future Environment

1. Geology, Topography, Soils, and Water Resources

The trends and rates described in the previous section as "natural" or "background" will continue essentially as at present. Accelerated rates largely due to roads and logging have begun to diminish, but it may be false to claim that these injuries are really "healing" or that the "background" rates will be approached within the time frame of this analysis. Watersheds, particularly ones which have attained topographic maturity such as have most in the North Coast, are constantly adjusting in an attempt to establish new equilibria in response to various perturbations. Slides, alteration of natural drainage courses, and changes in ground water flow patterns tend to trigger other types of events elsewhere as equilibrium is re-established throughout the drainage.

2. Vegetation and Wildlife

Vegetation succession, and changes in carrying capacity of the vegetation for the various wildlife species, will proceed, but it is difficult to predict when various interruptive inputs to the ecosystem (fire, landslide, *etc.*) will occur.

It is clear, however, that simply allowing nature to take its course will not return the Nooning Creek Watershed to its prior condition.

3. Visual Resources

Again, the present trend has been for the vegetation to increasingly mask the effects of logging road building, but it is difficult to predict whether past excavation will produce additional mass movement in several years, whether fire will remove the vegetation and uncover the old scars, *etc.*

CHAPTER IV

ENVIRONMENTAL CONSEQUENCES

A. Unavoidable Adverse Impacts of the Proposed Project and/or the Alternatives

1. Reclaiming abandoned logging roads, streamside stabilization and even planting of trees in Nooning Creek Watershed could contribute to the formation of new superficial landslides. No landslide features were observed at road reclaiming sites, so impacts should be minimal if overburden waste is terraced and sloped and then seeded with mulch, fertilizer and selected grasses suitable for the area.

2. Soils

The possibility of triggering superficial landslides, which are a gross form of soil erosion, has been referred to in the preceding section. It is rather difficult to predict the soil erosion impacts.

3. Water Resources

As with the geology and soils, one is at a loss to prediction of the magnitude of adverse impacts, or to relate this increment of water resources impact to what has occurred and will continue to occur in the Nooning Creek Watershed if no action is taken to prevent excessive erosion.

4. Wildlife

Temporary adverse impacts of the proposed action involve two major categories: 1) mortality of animals, and 2) the disturbance of wildlife.

It is anticipated that low numbers of the smaller less mobile animals will be killed outright by various road reclaiming activities. This would include such small animals as moles, gophers, lizards, and amphibians. Direct loss of wildlife is increased if road reclaiming takes place during the reproductive season when dependent young are present. The major reproductive activity occurs during April to mid-July.

Road reclaiming will temporarily frighten the larger more wary animals from the area. These animals including the coyote, gray fox, black bear, deer, raptors, and woodpeckers will reoccupy nearby suitable habitat after the disturbance subsides.

B. Short-Term Uses Versus Long-Term Productivity

The unavoidable adverse impacts cited in the preceding section do not involve a decrease in long-term productivity. These are the kinds of impacts that are short lived and beyond that they become irrelevant in the face of excessive erosion problems in Nooning Creek Watershed.

C. Irreversible and Irretrievable Committment of Resources

Because of the alternatives (i.e., no action) are not substantially different from the proposal no tabular display comparing proposed and alternatives will be employed.

CHAPTER V

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Page 19

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